Freeze Date Straw Proposal CMPWG

July 29th, 2020

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2 Abbreviations, Acronyms, and Defined Terms

2.1 Acronyms & Abbreviations

Abbreviation/ Acronym	Meaning
AFC	Available Flowgate Capability
ASTFC	Available Shared Transfer Flowgate Capability
ATC	Available Transfer Capability
BA	Balancing Authority
BAA	Balancing Authority Area
CBM	Capacity Benefit Margin
CMP	Congestion Management Process
CMPC	Congestion Management Process Council
CMPWG	Congestion Management Process Working Group
CMR	Congestion Management Resource
CZ	Control Zone
DNR	Designated Network Resource
DRE	Deficient Reciprocal Entity
ED2	Economic Dispatch 2
ED6	Economic Dispatch 6
EOR	Energy Only Resource
CPC	Contract Path Capacity
FFE	Firm Flow Entitlement
FFL	Firm Flow Limit
FN7	Firm Network
FTSR	Firm Transmission Network Reservation
GLDF	Generation-to-load Distribution Factor

GSF	Generation Shift Factor
GTL	Generation-to-Load
IDC	Interchange Distribution Calculator
IRE	Impacted Reciprocal Entity
JOA	Joint Operating Agreement
JOU	Jointly Owned Unit
LBA	Local Balancing Authority
LDF	Load Distribution Factor
M2M	Market-to-Market
MOPI	Michigan-Ontario PAR Interface
MW	Megawatt
NITS	Network Integrated Transmission Service
NITS	Network Integrated Transmission Service
OASIS	Open Access Same-time Information System
PB4	Prevailing Bucket 4
PFV	Parallel Flow Visualization
POD	Point-of-Delivery
POR	Point-of-Receipt
PTP	Point-to-Point
RPT	Regional Pseudo-Tie
RTO	Regional Transmission Organization
TDF	Transfer Distribution Factor
TLR	Transmission Loading Relief
TRM	Transmission Reliability Margin
TSR	Transmission Service Reservation
WGSF	Weighted Generation Shift Factor
WLDF	Weighted Load Shift Factor

2.2 Defined Terms

Any undefined, capitalized terms used in this document shall have the meaning given under industry custom and, where applicable, in accordance with good utility practices.

Term	Definition
Attaining BA	The BA that a Pseudo-Tied generator or load belongs to currently
Available Flowgate Capability (AFC)	A measure of the flow capability remaining on a Flowgate for further commercial activity over and above already committed uses
Available Share of Total Flowgate Capability (ASTFC)	The Flowgate capability that remains on a Flowgate for use as Firm Transmission Service after accounting for each entity's STFC, DA GTL Impacts, and some portion of confirmed TSR impacts
Available Transfer Capability (ATC)	A measure of the transfer capability remaining in the physical transmission network for further commercial activity over and above already committed uses
Balancing Authority (BA)	The responsible entity that integrates resource plans ahead of time, maintains load-interchange-generation balance within a Balancing Authority Area, and supports interconnection frequency in real-time
Balancing Authority Area (BAA)	The collection of generation, transmission, and loads within the metered boundaries of the BA. The BA maintains load-resource balance within this area
Capacity Benefit Margin (CBM)	The amount of firm transmission transfer capability preserved by the transmission provider for Load-Serving Entities (LSEs), whose loads are located on that Transmission Service Provider's system, to enable access by the LSEs to generation from interconnected systems to meet generation reliability requirements. Preservation of CBM for an LSE allows that entity to reduce its installed generating capacity below that which may otherwise have been necessary without interconnections to meet its generation reliability requirements. The transmission transfer capability preserved as CBM is intended to be used by the LSE only in times of emergency generation deficiencies
Congestion Management Process (CMP)	The process described in: • Attachment 2 of the PJM-MISO JOA • Attachment 2 of the PJM-TVA-LG&E/KU JRCA • Attachment 2 of the MISO-SPP JOA • MISO-MHEB Coordination and Operating Agreements • MISO-Minnkota Coordination and Operating Agreements

Term	Definition
Congestion Management Process Council (CMPC)	A council of signatories to the Congestion Management Process, formed for the purpose of promoting communication, providing mutual assistance, and coordinating in areas of mutual consent with regard to the implementation of the Congestion Management Process
Congestion Management Process Working Group (CMPWG)	A working group of signatories to the Congestion Management Process that provide technical and business assistance and recommendations to the Congestion Management Process Council as it endeavors to achieve mutual consent with regard to the implementation of the Congestion Management Process
Congestion Management Resource (CMR)	Generators that have the ability to be, or are designated by an entity to serve its load. Definitions for each CMP entity exist in section 7.2.3
Contract Path	A predetermined Transmission Service electrical path between contiguous Transmission Providers established for scheduling and commercial settlement purposes that represents the continuous flow of electrical energy between the parties to a transaction
Control Zone	Within an Operating Entity Balancing Authority Area that is operating with a common economic dispatch, the Operating Entity footprint is divided into zones to provide specific zonal regulation and operating reserve requirements in order to facilitate reliability and overall load balancing. The zones must be bounded by adequate telemetry to balance generation and load within the zone utilizing automatic generation control. Control Zones within the MISO BAA are referred to as LBAs
Coordinated Flowgate	A Flowgate impacted by an Operating Entity as determined by one of the four studies detailed in Section 3 of the CMP. For a Market-Based Operating Entity, these Flowgates will be subject to the requirements under the Congestion Management portion of the Congestion Management Process (Sections 4 and 5). A Coordinated Flowgate may be under the operational control of a Third Party
Curtailment Threshold	The minimum TDF or GLDF which, if exceeded, will subject an Interchange Transaction and/or Generation-to-Load to curtailment to relieve a Flowgate as specified in Business Practice Standards WEQ-008-3.10. This threshold was 5% at the time this document was authored
Deficient Reciprocal Entity (DRE)	The Reciprocal Entity who needs additional ASTFC in the Allocation Sharing & Transfer process
Designated Network Resource (DNR)	A Network Resource designated pursuant to the provisions of the FERC pro forma OATT
Down-to-Zero	Refers to flow attributes (impacts, allocations, limits, etc.) on a Flowgate that are associated with all injections and withdraws regardless of their TDF or GLDF
Eastern Interconnection	One of the major electric system networks in North America

Term	Definition
Economic Dispatch 2 (ED2)	A Transmission Service priority consistent with non-firm PTP Hourly Service (NH) as defined in NAESB 3.2 – WEQ 008-2.1.3
Economic Dispatch 6 (ED6)	A Transmission Service priority consistent with Secondary Network Transmission Service (NN) as defined in NAESB 3.2 – WEQ 008-2.1.7
Eligible Customer	Shall have the same meaning as defined in the FERC Pro-Forma OATT
Energy Only Resource (EOR)	Generators that do not meet the CMR designation requirements of the BA or CMP entity to which they belong are referred to as an Energy Only Resource (EOR)
Excess Flowgate Capacity	Flowgate capacity that exists after the TRM, CBM, and the total of all impacts eligible for allocation (as defined in section 7.9) are subtracted from the Flowgate Rating of that Flowgate
Contract Path Capacity (CPC)	The firm limit of the MISO Regional Transfer, specified in sections 2.2 and 2.3 of the settlement agreement[1]
Firm Flow	Flows that are assigned a Transmission Service priority consistent with Priority 7 - firm PTP – (F), firm NITS – (FN), and CBM – (CB) as defined in NAESB 3.2 – WEQ 0008-2.1.8
Firm Flow Entitlement (FFE)	Firm limits used in forward market constructs and after-the-fact real-time market settlements between one or more Market Based Operating Entities
Firm Flow Limit (FFL)	The maximum value of Firm Flows an entity can have on a Coordinated or Reciprocal Coordinated Flowgate, based on procedures defined in Sections 4 and 5 of the CMP agreement that existed at the time this document was authored.
Firm Transmission Service	The highest quality service offered to Transmission Customers under a filed rate. Firm Transmission Service includes firm PTP and firm NITS.
Firm Transmission Service Reservation (FTSR)	A Transmission Service Reservation that provides a customer with Firm Transmission Service
Flowgate	1) A portion of the transmission system through which the IDC calculates the power flow from Interchange Transactions. 2) A mathematical construct, comprised of one or more monitored transmission facilities and optionally one or more contingency facilities, used to analyze the impact of power flows upon the Bulk Electric System
Flowgate Rating	The seasonally calculated value (such as MW, Mvar, amperes, frequency or volts) that satisfies the most limiting of the prescribed operating criteria for a specified system configuration to ensure operation within

[1] As defined in the settlement agreement entered into between the MISO, SPP, and other entities in FERC docket EL14-21-000, et al.

Term	Definition
	acceptable reliability criteria. Flowgate Ratings are based upon assumed operating criteria for each season. These include, but are not limited to: • Facility Ratings (applicable pre- and post-Contingency Equipment Ratings or Facility Ratings) • Transient stability ratings (applicable pre- and post- Contingency stability limits) • Voltage stability ratings (applicable pre- and post-Contingency voltage stability) • System voltage limits (applicable pre- and post-Contingency voltage limits)
Freeze Date	April 1, 2004
Freeze Date CMR	A CMR that existed as of the Freeze Date
Freeze Date DNR	DNRs that existed as of the Freeze Date
Generation Shift Factor (GSF)	A factor to be applied to a generator's expected change in output to determine the amount of flow contribution that change in output will impose on an identified transmission facility or Flowgate
Generation-to-Load (GTL)	The calculated energy flows on a specific Flowgate as a result of the dispatch of a generating resource(s) within a BAA, HBAA, or Control Zone serving load within the same BAA, HBAA, or Control Zone
Generation-to-load Distribution Factor (GLDF)	The algebraic sum of a GSF or WGSF and a LSF or WLSF, expressed in a percentage that flows across a Flowgate, to determine the total impact of an Interchange Transaction or Generation-to-Load on a Flowgate
Historical Balancing Authority Area (HBAA)	A Balancing Authority Area that existed at the time of the Freeze Date
Historical Ratio	The ratio of each entity's seasonal total impacts to the total seasonal impacts of all entities on a Flowgate
Impacted Reciprocal Entity (IRE)	The Reciprocal Entity who gives additional ASTFC in the Allocation Sharing & Transfer process
Inter-BA	Between two Balancing Authorities
Interchange Distribution Calculator (IDC)	The mechanism used by RCs in the Eastern Interconnection to calculate the distribution of Interchange Transactions over specific Flowgates. It includes a database of all Interchange Transactions and a matrix of the Distribution Factors for the Eastern Interconnection
Interchange Transaction	An agreement to transfer energy from a seller to a buyer that crosses one or more BAAs boundaries.
Intra-BA	Within a single Balancing Authority
Joint Operating Agreement (JOA)	An agreement between two or more Operating Entities
Jointly Owned Unit (JOU)	A unit in which two or more entities share ownership

Term	Definition
Load Shift Factor (LSF or LDF)	A factor to be applied to a load's expected change in demand to determine the amount of flow contribution that change in demand will impose on an identified transmission facility or Flowgate
Local Balancing Authority (LBA)	Local Balancing Authority shall mean an operational entity which is: (i) responsible for compliance to NERC for the subset of NERC Balancing Authority Reliability Standards defined for its local area within MISO Balancing Authority Area, and (ii) a party (other than MISO) to the Balancing Authority Amended Agreement which, among other things, establishes the subset of NERC Balancing Authority Reliability Standards for which the LBA is responsible
Marginal Zone Participation Factor	A zonal factor that describes a Control Zone's participation in re-dispatch due to a change of imports and/or exports
Market Based Operating Entity	An Operating Entity that operates a security constrained, bid-based economic dispatch bounded by a clearly defined market area.
Market Flow	The calculated energy flows on a specified Flowgate as a result of dispatch of generating resources serving market load within a Market-Based Operating Entity's market (excluding Interchange Transactions)
Market-to-Market (M2M)	The co-optimization of congestion management through the implementation of operational and planning based protocols between two Market Based Operating Entities. Market-to-Market functionality is defined in the following agreements: • MISO-PJM JOA • MISO-SPP JOA
Michigan Ontario PAR Interface (MOPI)	The AC Interface regulated by PARs between MISO and IESO
MISO Regional Transfer	The power transfer between the MISO South and the MISO Midwest regions and is based on the difference between generation and load in the South region of the MISO Balancing Authority Area (BA Area), with an adjustment for interchange transactions with the BA Areas physically connected to the MISO South region with consideration of Regional Pseudo-ties[1]
Monitoring RTO (MRTO)	The RTO that is the owner of a Market-to-Market Flowgate
Native BA	The BA that a Pseudo-Tied generator or load belonged to before becoming a Pseudo-Tie
Native Load Customer	The wholesale and retail power customers of the Transmission Provider on whose behalf the Transmission Provider, by statute, franchise, regulatory requirement, or contract, has undertaken an obligation to construct and operate the Transmission Provider's system to meet the reliable electric needs of such customers

Term	Definition
NERC Book of Flowgates (BOF)	The master list of Flowgates used by the IDC
Network Integrated Transmission Service (NITS)	As specified in the Transmission Provider's tariff, service that allows an electric Transmission Customer to integrate, plan, economically dispatch and regulate its network resources in a manner comparable to that in which the Transmission Provider serves Native Load Customers
Network Load	Shall have the same meaning as defined in the FERC pro forma OATT
NITS Application	A request by an Eligible Customer for Network Integration Transmission Service pursuant to the provisions of the FERC Pro-Forma OATT
Non-Monitoring RTO (NMRTO)	The RTO that is not the owner of a Market-to-Market Flowgate
Non-Owning Reciprocal Entity (CMP RE)	A Reciprocal Entity that is not the owner of the Flowgate
Non-Reciprocal CMP Entity	An entity that is a signatory to the CMP agreement, but not a Reciprocal Entity
Non-Threshold	Refers to flow attributes (impacts, allocations, limits, etc.) on a Flowgate that are associated with the injections and withdrawals that have a TDF or GLDF below the Curtailment Threshold
Open Access Same-Time Information System (OASIS)	Comprises the computer systems and associated communications facilities that public utilities are required to provide for the purpose of making available to all transmission users comparable interactions with Transmission Service Information and any back-end supporting systems or user procedures that collectively perform the transaction processing functions associated with handling of requests on OASIS
Operating Entity	An entity that operates and controls a portion of the bulk transmission system with the goal of ensuring reliable energy interchange between generators, loads, and other operating entities
Owning Reciprocal Entity	The Reciprocal Entity that is the owner of the Flowgate
Parties	Signatories to the CMP
Point-of-Delivery (POD)	A location that the Transmission Service Provider specifies on its transmission system where an Interchange Transaction leaves or a Load-Serving Entity receives its energy. A Point-of-Delivery can be either a BAA or a Control Zone
Point-of-Receipt (POR)	A location that the Transmission Service Provider specifies on its transmission system where an Interchange Transaction enters or a generator delivers its output. A Point-of-Receipt can be either a BAA or a Control Zone

Term	Definition
Point-to-Point (PTP)	The reservation and transmission of capacity and energy on either a firm or non-firm basis from the PORs to the PODs as specified in the Transmission Provider's tariff
Post-Freeze-Date CMR	A CMR that existed after the Freeze Date
Prevailing Bucket 4 (PB4)	Represents the change or delta impact between HBAA and BAA dispatch
Pseudo-Tie	A time-varying energy transfer that is updated in real-time and included in the Net Actual Interchange term in the same manner as a tie line in the affected BA's control ACE equations (or alternate control processes)
Reciprocal Entity (RE)	An entity that is coordinated on a Reciprocally Coordinated Flowgate
Reciprocally Coordinated Flowgate (RCF)	Reciprocal Coordinated Flowgate shall mean a Flowgate that is subject to reciprocal coordination by Operating Entities, under the CMP (with respect to Parties only) or a Reciprocal Coordination Agreement between one or more Parties and one or more Third Party Operating Entities. An RCF is: • A Coordinated Flowgate that is (a) (i) within the operational control of a Reciprocal Entity or (ii) may be subject to the supervision of a Reciprocal Entity as a RC, and (b) affected by the transmission of energy by the Parties or by either Party of both Parties and one or more Reciprocal Entities; or • A Coordinated Flowgate that is (a) affected by the transmission of energy by one or more Parties and one or more Third Party Operating Entities, and (b) expressly made subject to CMP reciprocal coordination procedures under a Reciprocal Coordination Agreement between or among such Parties and Third Party Operating Entities; or • A Coordinated Flowgate that is designated by agreement of both Parties as an RCF
Regional Pseudo-Ties (RPT)	Regional Pseudo-Ties are special case non-MISO market operating arrangements (Pseudo-Ties) that specifically require capacity (MISO transmission service) between the MISO regions to support the transfer of energy. Regional Pseudo-Ties are identified in the settlement agreement.[1]. The list of Regional Pseudo-Ties and their treatment is listed in Appendix B of the Regional Transfer Manual.
Regional Transmission Organization (RTO)	RTOs are independent, membership-based, non-profit organizations that ensure reliability and optimize supply and demand bids for wholesale electric power. The minimum characteristics and functions that define an RTO are listed in FERC order 2000
Reliability Transfer	The transfer of energy between HBAAs in bucket 3. See section 7.7.3.3
Rollover Rights	The guarantee of future renewal associated with a Transmission Service Reservation that has a duration of 5 years or longer

Term	Definition
Run Type	A calculation that is defined by an execution schedule for a set of future operating windows that each have their own load and outage assumptions. Run Types are further specified in section 7.6
Share of Total Flowgate Capacity (STFC)	The maximum total impact each entity is allowed to have on that Flowgate for the purpose of selling Firm Transmission Service, represented by the Down-to-Zero 2DA allocation
Third Party	An entity that is neither a signatory to the CMP agreement or a Reciprocal Entity
Threshold	Refers to flow attributes (impacts, allocations, limits, etc.) on a Flowgate that are associated with the injections and withdrawals that have a TDF or GLDF at or above the Curtailment Threshold
Transfer	The transfer of energy between Control Zones or HBAAs within the same BAA
Transfer Distribution Factor (TDF)	The portion of an Interchange Transaction or TSR, expressed in a percentage that flows across a Flowgate
Transmission Loading Relief (TLR)	Transmission Loading Relief shall mean the procedures used in the Eastern Interconnection as specified in NERC reliability standard IRO-006 and the NAESB business practice WEQ-008.
Transmission Provider (TP)	A utility that owns, controls, or operates facilities used for the transmission of electric energy in interstate commerce and provides Transmission Service
Transmission Reliability Margin (TRM)	The amount of transmission transfer capability necessary to provide reasonable assurance that the interconnected transmission network will be secure. TRM accounts for the inherent uncertainty in system conditions and the need for operating flexibility to ensure reliable system operation as system conditions change.
Transmission Service Reservation (TSR)	Reservations that provide a customer with Transmission Service
Weighted Generation Shift Factor (WGSF)	A weighted GSF that can represent the impact of generation in a BAA, HBAA, or Control Zone on a Flowgate. Typically a WGSF is calculated as $WGSF = \frac{\sum GSF*MW}{\sum MW}$
Weighted Load Shift Factor (WLSF or WLDF)	A weighted (typically by megawatt) LSF that can represent the impact of load in a BAA, HBAA, or Control Zone on a Flowgate. Typically a WLSF is calculated as $WLSF = \frac{\sum LSF*MW}{\sum MW}$

3 Introduction

The Congestion Management Process (CMP) agreement was created by entities that now make up the Congestion Management Process Council (CMPC). The CMPC members and CMP signatories currently include the Market Based Operating Entities PJM, MISO, SPP and non-Market Based Operating Entities TVA, Manitoba Hydro, Minnkota Power Cooperative, AECI, and LG&E/KU. In conjunction with NERC and NAESB standards, the CMP agreement prescribes the protocols necessary to equitably manage congestion on Reciprocally Coordinated Flowgates (RCF) owned by CMP Parties. Each member of the CMPC has a representative on the Congestion Management Process Working Group (CMPWG), which serves as a technical body of experts to make recommendations to the CMPC and to perform the day-to-day coordination and administration of the CMP.

In 2004, a concept referred to as the 'Freeze Date' was memorialized in the CMP to preserve the historical firm rights of the transmission system prior to the formation of organized markets based on the flows that existed in 2004. The Freeze Date represented a compromised solution that addressed equity issues that existed during that time. Since 2004, the topology, generation, operations, and planning practices have evolved which has necessitated an update of this Freeze Date solution to reflect present day use of the coordinated and planned transmission system

The CMP creates constructs that manage interregional congestion on both a real-time and forward looking basis. Currently, the protocols defined in the CMP prescribe how to quantify real-time impacts (Market Flows) from Market Based Operating Entities and prioritize these Market Flows for use in curtailment in the Interchange Distribution Calculator (IDC) under a Transmission Loading Relief (TLR). This calculation of Market Flow prioritization is achieved by the calculation of Firm Flow Limits (FFL) and Non-Firm ED6 Limits. These limits, and by extension, the prioritization of Market Flows, are established through a rigorous process that reflects the principles discussed further in this document.

The sale of Transmission Service occurs on a forward looking basis to facilitate the commercial needs of future operating horizons. To limit these firm transmission sales and respect the historical usage of the transmission network, CMP entities calculate the Available Share of Total Flowgate Capability (ASTFC) on each RCF and use it as an input to the Available Flowgate Capability (AFC)/Available Transfer Capability (ATC) processes. The ASTFC and AFC limits work together to ensure the sale of short-term (less than one year) Transmission Service isn't oversold, which would prescribe congestion when the operating horizon arrives. The Parties coordinate the impacts of the sale of long-term (one year or longer) Transmission Service in accordance with their respective tariffs and applicable Joint Operating Agreements (JOA).

MISO and PJM, as well as MISO and SPP, each have a JOA that extends the functionality of the CMP agreement into Market-to-Market (M2M) coordination. JOAs between Market Based Operating Entities further build upon the ideas of Market Flows and firm limits used in the TLR process. Currently, Market Flows calculated for use in the TLR process are identical to the Market Flows calculated for use in the M2M process. Calculated in a similar manner as an FFL, Firm Flow Entitlements (FFE) are used as a

financial limit for an after-the-fact settlement calculation whenever the M2M process is used to manage congestion on an RCF.

This whitepaper introduces proposed changes to the Market Flows and FFEs used in the M2M process only, and does not address the FFL, firm and non-firm Market Flows used in the TLR process, or ASTFC values used in the sale of firm Transmission Service.

4 Guiding Principles

This whitepaper provides background information, a summary of the solution and its design components. Some of the design components included in this solution may not be applicable to all entities, and may be different between Market and non-Market Based Operating Entities. This solution incorporates the following guiding principles established in 2014 by the CMPC.

4.1 Reliability

As the most important principle, the CMP solution should ensure and support the reliable operation of the transmission system.

4.2 Coordination

The CMP solution should seek to

1. Coordinate the long-term planning process, short term planning process, and real-time operations to promote efficient use of the transmission system
2. Acknowledge the interregional impacts of delivering Network Resources to Network Load in long-term planning constructs such that upgrades are planned to efficiently use the interconnected system
3. Use interregional impacts as an input to the establishment of rights that are then consistently recognized in short term planning and real-time operations

Historically, the transmission system was planned under the assumption that some amount of inadvertent usage of neighboring transmission systems would occur. These transmission-planning processes were coordinated on an interregional basis. The initial processes that established firm limits were designed to recognize and maintain the ability to use the interconnected transmission system to deliver Network Resources to Network Load. In the future, as each planning entity executes its long term planning process, expansion of the transmission system should continue to reliably and efficiently support the delivery of Network Resources to Network Load, in recognition of the interconnected nature of the transmission system.

Planning processes should evaluate the external impacts of interconnections, coordinate with impacted external entities to prescribe necessary system upgrades, and ensure that the benefits of these system upgrades are reflected in the firm limits (firm rights) of the entities that fund those upgrades. This ensures that the entities contributing to congestion are held responsible in maintaining the reliable operation of the transmission system and to have their investments in the transmission system reflected in their rights to use it.

4.3 Equity

For purposes of this agreement, equity means:

1. To protect current and future transmission investments
2. To recognize incremental transmission upgrades and investments
3. Equitable treatment for Market Based Operating Entities and non-Market Based Operating Entities
4. Equitable assignment of congestion costs

CMP entities have a continued need to address how different congestion management methodologies (market based and traditional) interact to recognize and control parallel flows. The current CMP enables Market Based Operating Entities to respond to TLR relief obligations in a manner that is consistent with how non-Market Based Operating Entities respond. The resulting Market Flows and firm limits reflect the historical configuration and rights derived from previous and ongoing coordinated interregional transmission planning processes. However, the current Freeze Date process does not reflect the present day use of the coordinated and planned transmission system. In guiding the working group in developing alternatives to the Freeze Date process, the council established these guiding principles with respect to equity:

1. Recognize the transmission investments made both before and after the Freeze Date
2. Ensure equitable treatment of Market Based Operating Entities as well as non-Market Based Operating Entities
3. Ensure equitable assignment of congestion costs

4.4 Efficiency

The CMP agreement should seek to:

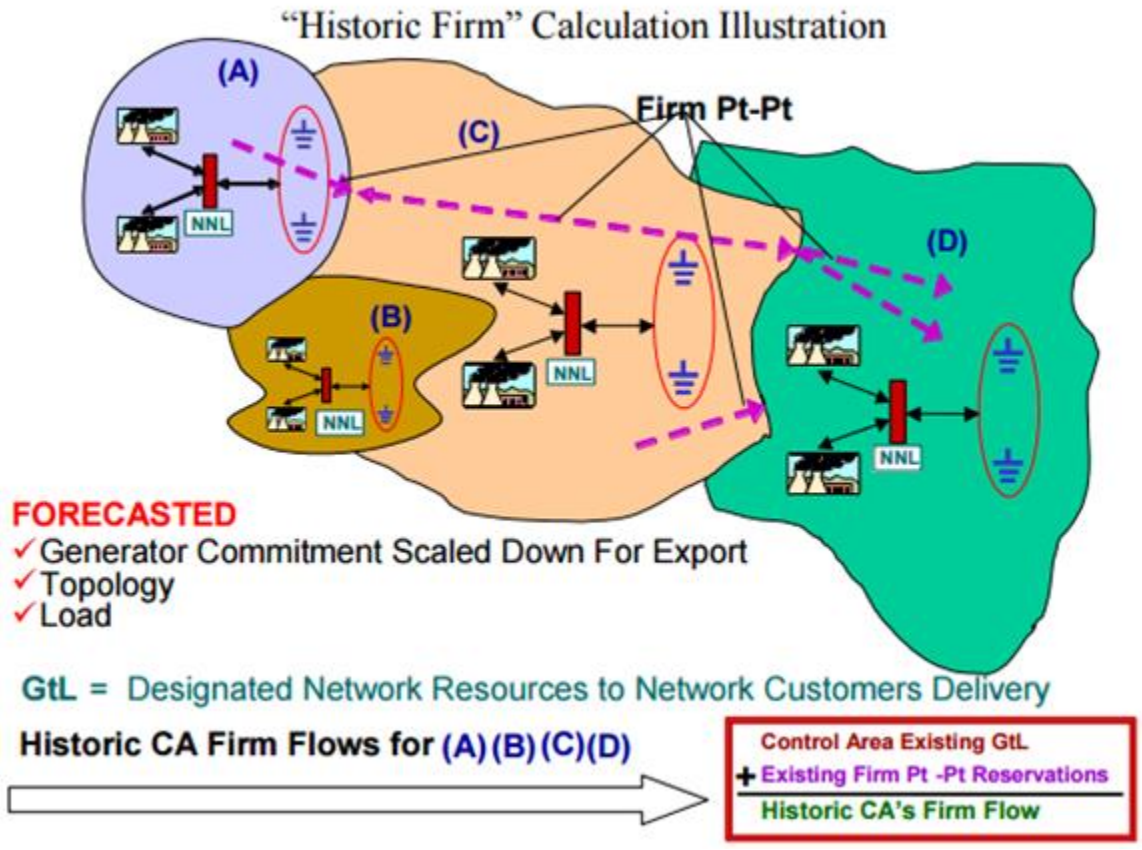
1. Encourage interregional, economic, and operational efficiencies
2. Provide transparent, appropriate, and consistent price signals across the seams

5 Existing Process Background

5.1 Impacts, Allocations, and Firm Limits

At the time of writing this whitepaper, the historical firm rights calculated for each CMP entity uses a snapshot of generators and TSRs that existed in 2004 (prior to most major market integrations) along with the most recent topology (IDC model), load, outage forecasts, and any generation retirements. In this calculation, the BAs that existed in the EI at this time (2004) are preserved. These BAs have been re-designated as Control Zones within the current BAs with which they have integrated. For each Control Zone, directional GTL (based on established generator priorities) and PTP impacts are calculated on a dynamic set of regional Flowgates for a number of forward looking horizons, each with different load and outage forecasts. Figure 1 illustrates the general concept.

Figure 1 - Historical Firm Calculation[2]



These impacts are aggregated on a Flowgate and BA basis, and downloaded by each CMP entity, who then use a universally agreed upon set of rules to allocate these historical impacts into historical allocations on a BA basis.

[2] This Figure is taken from section 6.4 of the CMP agreement that exists as of the writing of this whitepaper.

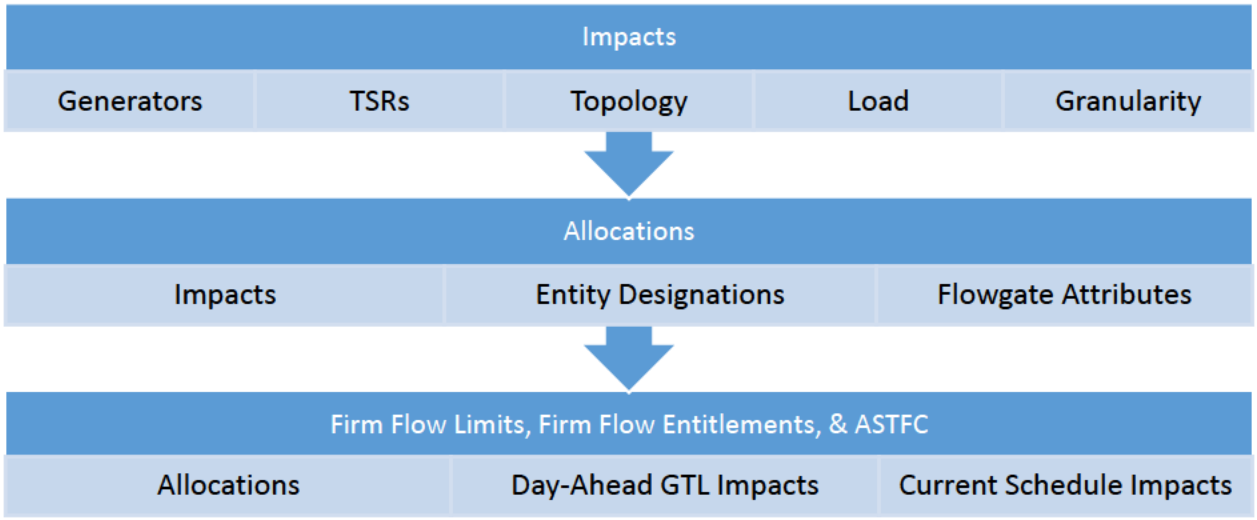
The forward horizon calculations consist of the following schedule shown in Table 1, and a "higher-of" logic is used in an attempt to protect entities from undue harm due to outages and other factors.

Table 1 – Forward Calculation Schedule

Allocation Run Type	Allocation Process Start	Range Allocated	Allocation Process Complete
April Seasonal Firm	Every April 1 at 8:00 EST	Twelve monthly values from October 1 of the current year through September 30 of the next year	April 1 at 12:00 EST
October Seasonal Firm	Every October 1 at 8:00 EST	Twelve monthly values from April 1 of next year through March 31 of the following year	October 1 at 12:00 EST
Monthly Firm	Every month on the second day of the month at 8:00 EST	Six monthly values for the next six successive months	2nd of the month at 12:00 EST
Weekly Firm	Every Monday at 8:00 EST	Seven daily values for the next Monday through Sunday	Monday at 12:00 EST
Two-Day Ahead Firm	Every Day at 17:00 EST	One daily value for the day after tomorrow	Current Day at 18:00 EST
Day Ahead Non-Firm	Every Day at 8:00 EST	Twenty-four hourly values for the next 24-hour period (Next Day HE1-HE24 EST)	Current Day at 9:00 EST

These allocations are used in each CMP entity's AFC and ATC calculations for use in the evaluation of Transmission Service sales for the same horizons. They are also used to directly establish firm and non-firm curtailments under TLR and are an input to the FFE calculation. A calculation flow diagram is shown in Figure 2.

Figure 2: Firm Limit Calculation



5.2 Market Flow

As of the publishing of this whitepaper, the Market Flow calculation provides real-time, EMS-based insight into the GTL loop flows induced by Market Based Operating Entities on Flowgates throughout the Eastern Interconnection. For purposes of the Market Flow determination, the market area is typically defined to be one of the following: (1) the entire RTO footprint or (2) a subset of the RTO region, such as a pre-integration NERC-recognized Balancing Authority Area, as necessary to ensure accurate determinations and consistency with pre-integration flow determinations. The Market Flow calculation determines flows in the forward, reverse, and net directions on each Coordinated Flowgate.

Because Interchange Transactions are curtailable by the IDC via a TLR, Market Flows used for TLR curtailments aim to quantify GTL impacts of each BA only. To account for the impact of exporting and importing Interchange Transactions, generation and load is scaled down when determining the amount of Market Flow using one of three methods (described further in section 7.15.1.1):

- POR/POD Method – Import and Export Interchange Transactions scale down load and generation based on the POD or POR of the TSR
- Marginal Zone Method – Import and Export Interchange Transactions scale down load and generation based on the Control Zones in which the marginal generation anticipated to support the incremental change in interchange.
- Slice of System Method – Import and Export Interchange Transactions scale down load and generation based on the entire market footprint within the BA.

Online generation first serves its native (Control Zone) load with native (Control Zone) generation. Leftover generation then serves remaining BA load represented by a transfer from generation in one Control Zone serving load in another Control Zone. Native and transfer Market Flows are calculated on each Flowgate, and if the Generation-to-Load Distribution Factor (GLDF) or Transfer Distribution Factor (TDF) of either of those types of impact meet or exceed the NAESB Curtailment Threshold, those Market Flows are eligible for curtailment under a TLR.

Forward and reverse Threshold Market Flow are separated into firm and non-firm categories and submitted to the IDC by each Market Based Operating Entity. Net Down-to-Zero Market Flow is used in M2M coordination and settlements. It is important to note that the GTL flow calculation employed in the Parallel Flow Visualization (PFV) calculation – the implementation of the WEQ-008 NAESB standards – uses this same native and transfer approach implemented by the CMP for Market Based Operating Entities.

6 Summary of Changes

Updates to the JOAs and CMP will modify inputs to the M2M congestion management protocol only. Fundamentally, the anticipated adoption of the PFV (WEQ-008) standards changes the role of the CMP agreement and the roles of the signatories to the CMP. More specifically, these standards prescribe that Generation-to-Load (GTL) flows, alongside Point-to-Point (PTP) and control device impacts, are calculated for all BAs on every Flowgate in the NERC Book of Flowgates (BOF). This means that Market Flow calculated by Market Based Operating Entities will no longer be used for TLR curtailments, but the firm and non-firm limits will still be used to establish firm and non-firm quantities of GTL flows calculated by the IDC.

The M2M construct, both a reliability and economic based congestion management tool, uses net Market Flow and net FFE values to coordinate and settle on M2M Flowgates. Thus, for M2M, a change to the way the components of the net FFE (impact allocations) are calculated is necessary. Additionally, while the historic investment in the system should be recognized when establishing rights, market integrations have long been included in the planning and operational constructs that use existing BA granularity. Therefore, Flowgate impacts shall be calculated from both a pre-market integration and post-market integration perspective, allowing the resulting FFEs to reflect a blend of the two perspectives in granularity (and their principles) together. Similarly, the Market Flows used in M2M coordination and settlements will be updated to incorporate the current, post-integration granularity that reflects reality in current operational constructs.

The FFE prescribed in this proposed update of the freeze date process rely heavily on the principles that exist in modern planning constructs. This construct is based on principles of cost causation and beneficiary pays that help determine when investments in the transmission network, both regional and interregional, are necessary. These investments are often driven by requests for Congestion Management Resources (CMR) and Firm Transmission Service Reservations (FTSR) to serve Network Load using both the native and non-native transmission network. The concept of first rights, implemented through impact classifications, recognizes the responsibility of each Transmission Planning entity to ensure a reliable system despite impacts from neighboring entities that may fall below the thresholds that trigger coordination.

Together, these design considerations transforms the FFE calculation out of a static, immovable process to a perpetual, principle-based approach of quantifying the firm rights that each Market Based Operating Entity has to the interconnected transmission network. Reflecting the investments made both before and after market integrations will provide clear and efficient signals to the regional and interregional planning constructs.

7 Design Components

There are many different aspects of the ASTFC, FFL, and FFE calculations. These aspects have been broken down into design components. Included for each design component is a general description, the current practice that is used and the proposed solution agreed to by the CMP Parties. Table 2 provides a summary of the design components and the collaborated solutions.

Table 2 – Design Component Summary

Design Component	Section References	Current Process	Proposed Solution
Granularity	7.1	HBAA	HBAA for Buckets 1, 2, and 3 and Control Zone/BAA for Bucket 4
Resource Eligibility	7.2	Priority – Freeze Date DNRs Priority Zero – Post-Freeze-Date Generators Energy Only Resources included for PTP and GTL	CMR definition justified by individual planning approaches Bucket 1 – Freeze Date CMRs Bucket 2 – Post-Freeze-Date CMRs Bucket 3 & 4 - All CMRs are eligible Energy Only Resources excluded from GTL Explicit Intermittent Resource & Pseudo-Tie Treatment
Resource Merit Order	7.3	HBAA based priorities	Bucket 1-3: HBAA based priorities Bucket 4: BAA based priorities

Design Component	Section References	Current Process	Proposed Solution
Transmission Service Reservations	7.4	Historical Firm Inter-BA and Intra-BA TSRs that existed as of 6/1/2004 to 5/31/2005	Bucket 1 – all active Inter-BA Freeze Date TSRs Bucket 2 – all active Inter-BA Post-Freeze-Date TSRs with rollover rights Bucket 3 – N/A Bucket 4 TSR incremental: all active Inter-BA PTP TSRs and NITS TSRs with rollover rights RTO incremental: all active Inter-BA PTP TSRs with rollover rights
Transfers	7.5	None	Bucket 1 & 2 – No transfers Bucket 3 – HBAA Reliability Transfers, subject to contractual arrangements and reliability limits. Bucket 4 – Market based transfers that align with planning processes 1. TSR incremental 2. RTO incremental

Design Component	Section References	Current Process	Proposed Solution
Impact and Allocation Run Types	7.6	Seasonal, Monthly, Weekly, 2DA, and DA operating horizons Seasonal and Monthly Run Types have one value per month. Weekly and 2DA have one value per day. DA has 24 values per day, one for each hour.	Eliminated Seasonal Run Types. Monthly enhanced to run 2-18 months out. Created Month Ahead Run Type. Varying granularity. Future Monthly and Month Ahead Run Types have one value per month. Weekly and 2DA have one value per day. DA has 24 values per day, one for each hour.

Design Component	Section References	Current Process	Proposed Solution
Impact Calculation Methodology	7.7	The current impact calculation is comprised of the following steps: 1. PTP Impacts are calculated from historical Firm TSRs 2. HBAA based GTL is calculated using Freeze Date DNRs first and Post-Freeze-Date DNR resources second, and priority zero resources third. HBAA load adjusted by net TSR imports TSR impacts calculated using GTG method	The following steps are needed to calculate the impacts used in the net allocation calculation: 1. Bucket 1 – Calculate active Freeze Date Inter-BA TSR PTP impacts with both B1 EORs and CMRs eligible 2. Bucket 1 – Calculate Control Zone based GTL using Freeze Date CMRs 3. Bucket 2 – Calculate all remaining active Inter-BA TSR PTP impacts with all available EORs and CMRs eligible to source 4. Bucket 2 – Calculate Control Zone based GTL using Post-Freeze-Date CMRs 5. Bucket 3 (Reliability Transfers) – Calculate GTL impacts of long Control Zones serving short Control Zones 6. Bucket 4 – Calculate the TSR/RTO GTL impacts that align with current operational and planning constructs 7. Prevailing Bucket 4 – Calculate any incremental impacts Bucket 4 presents over Buckets 1 through 3 HBAA, Control Zone, and BAA generation and load adjusted using the Hybrid Method FTSR impacts calculated using GTL method **Impacts calculated for use in the directional allocation calculation will continue to use the current calculation process and all of the current inputs described in this whitepaper.**

Design Component	Section References	Current Process	Proposed Solution
Allocation Calculation Methodology	7.8	Allocations are calculated on directional basis using directional historical impacts for FFE/FFL/ASTFC Flowgates can be over allocated for FFE/FFL/ASTFC process Threshold and Down-To-Zero Allocations are calculated Complex rules exist for CBM inclusion Excess capacity allocated using Historical Ratio	The net allocation process will use the schedule of impact priorities shown in Table 3, where the higher impact priorities (lowest numerical in the table) will be allocated to the Flowgate first. Non-Threshold impacts, where eligible, will be allocated between the Reciprocal Entities. Bucket 3 impacts will have a 50% reduction applied after 4 years, and a 100% reduction applied after 8 years. Allocating impacts on Flowgates will be done on a net basis. Net allocations are the most appropriate way to allocate impacts as a primary input into the FFE calculation because Market-to-Market constructs use net, Down-to-Zero impacts for curtailment in real-time. The net allocations are capped to Flowgate limit so over allocation is not possible. **Directional allocations for use in FFL and ASTFC will continue to be calculated using the existing CMP rules.**

Design Component	Section References	Current Process	Proposed Solution

Table 3 - Impact Priorities

	Bucket 1				Bucket 2				Bucket 3				PB4			
Net Impact	Owner	CMP RE	CMP Non-RE	Third Party	Owner	CMP RE	CMP Non-RE	Third Party	Owner	CMP RE	CMP Non-RE	Third Party	Owner	CMP RE	CMP Non-RE	Third Party
Threshold	Priority Rank	1			2				3				9	10		
Non- Threshold		4		N/A	5	6		N/A	7	8		N/A	11	12		N/A

Allocating Excess Capacity	7.9	Socialized based on Historical Ratio to Flowgate Reciprocal Entities	For net allocations, excess capacity is allocated to the Flowgate Owner. For directional allocations, status quo.

Design Component	Section References	Current Process	Proposed Solution
Higher-of-Logic	7.10	Highest allocation from the April Seasonal, October Seasonal, Monthly, Weekly, and 2DA runs applied	For net allocations, the highest allocation from the Month-Ahead, Weekly, and 2DA runs applied. For directional allocations, the highest allocation from the Future Monthly, Month-Ahead, Weekly, and 2DA runs applied. This would be equivalent to the Higher-Of-Logic that exists under the current process and its Run Types.
Allocation Sharing & Transfers	7.11	Allocation Transfers must be made 7 days before operating day and adjust allocations for their use in ASTFC, FFL, and FFE calculations Allocation Sharing occurs within 7 days and does not adjust allocations for use in FFL and FFE calculations, but does effectively adjust ASTFC because the TSR requiring the allocation will be approved	Allocation Transfers and Allocation Sharing remain status quo for their application on the allocations fed into the FFL and ASTFC calculations. Adjustments to FFE for Allocation Transfers will no longer occur to avoid double counting.

Design Component	Section References	Current Process	Proposed Solution
Firm Flow Limit (FFL)	7.12	Comparison of forward 2DA allocation, DA GTL impacts, and real-time Schedule Impacts from Interchange Transactions to determine forward FFL Comparison of reverse 2DA allocation, DA GTL impacts determine reverse FFL	Status Quo
Available Share of Total Flowgate Capability (ASTFC)	7.13	Forward 2DA allocation minus net DA GTL impacts minus confirmed TSR impacts (85-100% Forward, 15-30% Reverse) establish ASTFC	Status Quo
Firm Flow Entitlement (FFE)	7.14	Evaluation of forward 2DA allocation, DA GTL Impacts, and real-time Schedule Impacts to determine forward FFE Evaluation of reverse 2DA Allocation, DA GTL impacts determine reverse FFE Net FFE = Forward FFE – Reverse FFE	Evaluation of Net 2DA Allocation, DA GTL Impacts, and real-time Schedule Impacts instead of directional values

Design Component	Section References	Current Process	Proposed Solution
Market Flow Calculation	7.15	Interchange Transactions scale generation and load using the Directional Approach defined in section 7.7.1.1.2 Native and Transfer Market Flow is calculated for each Flowgate for both TLR and M2M	**For TLR:** 1. Until the NAESB v3.3 WEQ-008 standards are approved and while PFV is not implemented in the IDC: a. Interchange Transactions scale generation and load using the Directional Approach defined in section 7.7.1.1.2 b. Native and Transfer Market Flow is calculated for each Flowgate for TLR 2. Once the standards are adopted by the industry, then the IDC will calculate GTL impacts and replace Market Flow for use in TLR **For M2M:** 1. Interchange Transactions scale generation and load using the Hybrid approach defined in section 7.7.1.1.3 2. A BAA, regional BAA, or Control Zone granularity is used to calculate GTL based Market Flow on each Flowgate

Parallel Flows and Planning Processes	7.16	Coordination between entities embodied in JOAs, the CMP, and business practice manuals	Commitments to pursue enhancements to or creation of additional agreements, including Joint Operating Agreements and Joint Planning Agreements. **MISO-SPP:** • Coordination of efforts on Interconnection and firm Transmission Service analysis to ensure consistency of identification of internal and external constraints • Committed to develop a process to address regional cost allocation voltage differences • Pursue development of a targeted market efficiency process • Consider interregional process and cost allocation changes **MISO-PJM:** No substantial changes necessary as part of the FFE only agreement **PJM-LG&E/KU&TVA:** • Enhancements to Interconnection and long-term firm Transmission Service Analysis that specify triggers for coordination • BAA Integration criteria that provides guidelines for integration studies and the cost allocation of associated upgrades **MISO-TVA/LG&E/AECI:** • At the time of releasing this paper, a draft version of the Joint Planning Agreement was near final legal

Design Component	Section References	Current Process	Proposed Solution
			reviews which establishes a Joint and Coordinated System Planning study process and affected system study parameters • Possible JOA effort pending FFL Agreement **SPP-TVA/LG&E/AECI:** No substantial changes necessary as part of the FFE only agreement
Out of scope items	7.17	Current System Topology	Out of scope

7.1 Granularity

7.1.1 Description

Granularity refers to the area of load that is served for the purpose of calculating impacts on each Flowgate. This component is important because the referenced area will determine the shift factors used in the impact calculation. It also determines the generator groupings and merit order used in serving load. Historical Balancing Authority Area (HBAA) granularity uses historical boundaries that existed prior to the Freeze Date to calculate GTL and PTP impacts. These HBAAs, while close to representing the granularity of the current existing Control Zones, represent the Balancing Authority Areas (BAA) that existed prior to the Freeze Date. RTO or BA level granularity uses the BAAs that exist today. Using RTO or BA level granularity results in impacts calculated from generation to the aggregated RTO or BAA load.

7.1.2 Current Practice

Granularity is currently only at the HBAA level.

7.1.3 Proposed Solution

The proposed solution will allow for preserving historical usage of the system while enhancing the calculation to accommodate updated BAA or RTO level dispatch and planning processes, if applicable. The solution involves calculating and allocating impacts grouped within different 'buckets'. Among other criteria, these buckets are used in defining the different categories of impacts discussed in section 7.8.3.1. Buckets 1 and 2 will preserve the historical usage by using HBAA granularity. The granularity of bucket 3 is defined on an HBAA basis for the transfer of power between HBAAs after bucket 2, to ensure all load is served in the impact calculation from the historical perspective. Bucket 4 will accommodate the entities that dispatch and plan their systems on a BAA or RTO basis by allocating transfer impacts between HBAAs, limited by the most restrictive reliability limit or contractual arrangement, if available. These transfers will originate from one of the two proposed transfer impact calculation methodologies outlined in 7.7.3.4. Transfer methodologies are intended to resemble the different planning analysis approaches that are currently being employed amongst CMP parties.

Table 4 shows the different buckets and the granularity they encompass for impacts calculated for net allocations. The impacts calculated for directional allocations will continue to use HBAA granularity.

Table 4 – Bucket Approach to Allocations

Buckets	System Granularity	FFE Impact Granularity (M2M)
Bucket 1	HBAA	HBAA
Bucket 2	HBAA	HBAA
Bucket 3	HBAA	HBAA

Bucket 4 - RTO	BAA/RTO	BAA/RTO
Bucket 4 - TSR	Control Zone	Control Zone

7.1.3.1 Pseudo-Tie treatment

The following rules will determine how Pseudo-Ties are included in the process

1. Whether a Pseudo-Tie is assigned to bucket 1, 2, or 3 is determined by the following rules
    a. The Attaining BA will account for the Pseudo-Tie in bucket 1 if a Freeze Date Transmission Service Reservation (TSR) or Freeze Date load contract exists
    b. The Attaining BA will apply the Pseudo-Tie in bucket 2 if the load served by the unit moves with the designated unit
    c. Otherwise, the Attaining BA will not apply the Pseudo-Tie in bucket 2. The rationale being that the load in the Native HBAA originally paid for Transmission Service and would have to rely on HBAA to HBAA transfers in bucket 3, which is not comparable to the impacts provided to the Attaining HBAA, as the Pseudo-Tied resource serves load in bucket 2. The Attaining BA, if necessary, can account for the Pseudo-Tie in bucket 3
2. The Attaining BA will account for the Pseudo-Tie in bucket 4
3. TSRs associated with Pseudo-Ties will not be used
4. The Native BA will remove Pseudo-Tie resource from their merit order file for all buckets

7.2 Resource Eligibility

7.2.1 Description

A list of eligible generators to serve each BAA or HBAA load is a cornerstone for the impact calculation. It is important that this list of generators only represent resources that an entity has proven can reliably be depended upon to serve its network load in its planning process. Generators fitting this description are determined differently by each CMP entity based on their interconnection, planning, and capacity requirements. Generators meeting those requirements either have the ability to be or have been designated to serve network load. Each set of these generators needs to be assigned a merit order in the list to be used in the impact calculation. This merit order is necessary because total generation is only assigned up to the load value of the HBAA plus assigned exports. Generation in excess of load may not be used in the impact calculation.

7.2.2 Current Practice

Currently, generators that were in service prior to the Freeze Date are assigned a merit order in which they are dispatched to serve load. These generators have been thus far referred to as Freeze Date Designated Network Resources (DNR). If any remaining load exists after dispatching these Freeze Date DNRs, generators commissioned after the Freeze Date are dispatched slice of system (pro-rata) to meet any remaining HBAA load. Any load remaining after all generation within the HBAA has been dispatched goes unserved.

7.2.3 Proposed Solution

Only Congestion Management Resources (CMR) are eligible to be included in the GTL impact calculation, and both CMRs and Energy Only Resources (EOR) can be used to source Inter-BA Firm Transmission Service Reservations (FTSR). Generally, EORs are not held to the same standards as CMRs in the interconnection process, and should not contribute towards the determination of firm rights in the GTL calculation. However, evaluation of TSRs in the interconnection process do generally include EORs as participating in source and sink scaling, and thus they will be included to support Inter-BA FTSRs in this process. All CMP entities agree to provide notification of any changes to processes associated with CMR eligibility. In order to preserve existing priorities of historical generation, Freeze Date CMRs are assigned on an HBAA basis in bucket one. Post-Freeze-Date CMRs are assigned on an HBAA basis in bucket two. To the extent that only a portion of the current maximum output of a CMR was a DNR under the Freeze Date, that CMR can have both Freeze Date and Post-Freeze-Date designations. The specific mechanics regarding the application of CMRs are detailed in Section 7.7.3. Which resources can be used in each bucket of the impact calculation is described in Table 5

Table 5 – CMR Classifications

Bucket	Description	Granularity
1	Freeze Date CMRs	HBAA
2	Post-Freeze-Date CMRs	HBAA

3	All CMRs	HBAA
4	All CMRs	Control Zone/RTO[3]

More specifically, each entities CMRs are established explicitly below

- PJM units with Capacity Interconnection Rights (CIRs)
    - Details regarding the Generation Interconnection process can be found in Parts IV and VI of the PJM tariff: https://www.pjm.com/directory/merged-tariffs/oatt.pdf
    - Details regarding the establishment of CIRs under the Planning process can be found in Schedules 9 and 10 of the PJM Reliability Assurance Agreement: https://www.pjm.com/directory/merged-tariffs/raa.pdf
    - Further details regarding how CIRs are established under the planning process can be found in PJM Manual 14B, Attachment C, Section C1: https://www.pjm.com/-/media/documents/manuals/m14b.ashx
    - PJM CMR list posting: https://pjm.com/markets-and-operations/etools/erpm.aspx

- MISO units that have Network Resource Interconnection Service (NRIS)
    - Details regarding the Generation Interconnection process can be found in Attachment X Generator Interconnection Procedures of the MISO tariff: https://www.misoenergy.org/legal/tariff/
    - Details regarding the establishment of units with NRIS under the Planning process can be found in Module E-1 of the MISO tariff: https://www.misoenergy.org/legal/tariff/
    - Further details regarding how NRIS is established under the planning process can be found in MISO Business Practice Manual 015 – Generator Interconnection, Section 6 and MISO Business Practice Manual 020 – Transmission Planning, Section 4.5.2: https://www.misoenergy.org/legal/business-practice-manuals/
    - MISO CMR list posting: https://www.misoenergy.org/planning/generator-interconnection/

- SPP units that are CMRs
    - SWPP's method for studying and granting DNR/CMRs are specified in SWPP's Tariff Attachment Z1.
    - The study process can also be found on the Transmission Services Page on SWPP's OASIS: http://sppoasis.spp.org/documents/swpp/transmission/TRPAGE.CFM
    - The list of SWPP's DNRs can also be found on SWPP's OASIS: https://www.oasis.oati.com

- TVA units that are CMRs
    - Details regarding TVA Generation Interconnection process can be found on the TVA OASIS (https://www.oasis.oati.com/tva/) under Generation Interconnection:

[3] Which granularity is assigned is determined by which planning process the CMP entity uses. This is further defined in section 7.7.3.4

Standard Large Generator Interconnection Procedures (LGIP) and Small Generator Interconnection Procedures (SGIP)

- A list of TVA DNRs can be found at: https://www.oasis.oati.com/tva/tvadocs/TVAdnrs.pdf
- A list of AECI DNRs can be found at: https://www.oasis.oati.com/woa/docs/AECI/AECIdocs/AECI_DNR.pdf

- MHEB units that are CMRs
  - MH DNR requirements are outlined in section 30.1 of the MH OATT. Generator Accreditation Requirements are detailed in Chapter K of the MH OATT Business Practice Manual. Both documents are posted on the MHEB OASIS site (http://www.oasis.oati.com/MHEB/index.html)
  - A list of MHEB DNRs can be found at: https://www.oasis.oati.com/woa/docs/MHEB/MHEBdocs/MHEB_current_designated_network_resources.pdf

- LG&E and KU units that are CMRs
  - LG&E and KU DNR requirements are outlined in Part III of the LG&E and KU Open Access Transmission Tariff, Attachment M Standard Large Generator Interconnection Procedures (LGIP) and LG&E and KU Business Practices Section 3.4 Network Integrated Transmission Service (NITS). Both documents are posted on the LG&E and KU OASIS site (https://www.oasis.oati.com/LGEE/index.html).
  - The list of LG&E and KU DNRs can also be found on the LG&E and KU OASIS site (https://www.oasis.oati.com/LGEE/index.html).

7.3 Resource Merit Order

7.3.1 Description:

Merit order refers to the order in which generators are dispatched to serve load in the impact calculation.

7.3.2 Current Practice:

The practice now allows each entity to assign a merit order number (1-10,000) to the portion of each generator that had was considered a Freeze Date DNR. All other generators or portions of generators have a priority of zero (dispatched last). Generators are dispatched to meet HBAA load in merit order from 1 to 10,000. If there is still load remaining after dispatching the generators with a non-zero priority, priority zero units are dispatched pro-rata within the HBAA up to the remaining load.

7.3.3 Proposed Solution:

The proposed solution will provide enhancements to the merit order process that aligns with the bucket structure specified in section 7.1.3, and eliminate the use of EORs. The process of establishing merit order files will continue to allow each entity to use their internal practices regarding the order units are dispatched to meet load. These practices have been approved for use by the CMPWG and any changes to these practices will require further approval from the group. There will be 4 general groups of generation, and Table 6 shows the attributes of each generator group and their different applications to the impact calculation methodology found in section 7.7.3

Table 6 – Generation Groups Used In the impact Calculation

Generator Group	Group Description	In Service Date	CMR	Priority Range	Dispatched for GTL	Scaling for Freeze Date Inter-BA TSR Exports	Scaling for Post Freeze Date Inter-BA TSR Exports
1	Freeze Date CMR	Prior to April 1, 2004	Y	1-20000	Y	Y	Y
2	Post-Freeze-Date CMR	Post April 1, 2004	Y	20001-40000	Y	N	Y
3	Freeze Date EOR	Prior to April 1, 2004	N	N/A	N	Y	Y
4	Post Freeze Date EOR	Post April 1, 2004	N	N/A	N	N	Y

7.3.3.1 Wind and Solar Resources

For wind and solar resources, the lesser of the assigned CMR MW and the historical three-year real-time average is dispatched appropriately within its group priority range, and the rest of the CMR capacity must be dispatched at the highest merit order number within its group (either 20000 or 40000).

For Bucket 4, CMRs are dispatched based on a BAA based priority ranking with no distinction between Freeze Date CMRs and Post-Freeze-Date CMRs. To establish a new merit order for BAA dispatch, the merit orders of groups 1 and 2 are merged by subtracting 20000 from the merit order number assigned for each generator in group 2. Generators are then dispatched using the new merit order per the process described for Bucket 4 in section 7.7.3.4.

7.4 Transmission Service Reservations

7.4.1 Description

Various types of firm PTP and firm Network Integrated Transmission Service (NITS) TSRs have been considered and evaluated for inclusion in the calculation of firm rights to the transmission system. In order to be included in the process, these reservations must be studied through an entity's planning process for reliability, in a manner similar to CMRs. Additionally, FERC Order 676-H provided NAESB with the authority to draft and implement a standardized method of submitting and processing, through Open Access Same-time Information System (OASIS), applications for NITS as well as updates, such as designation and termination of Network Resources and Network Loads, to existing NITS contracts. This effort has been referred to as "NITS on OASIS" by many Transmission Providers.

The different classes of TSRs that are considered in this process are:

- Freeze Date TSRs - Firm Inter-BA and Intra-BA TSRs that existed prior to the Freeze Date
- Post-Freeze-Date TSRs – Firm Inter-BA TSRs that exist today, that did not exist as of the Freeze Date
- NITS TSRs – Representation of Transmission Service in the form of a TSR or a NAESB-defined NITS Application that explicitly designates a generator, or set of generators, to serve a specific network load in accordance with the Network Resource designation requirements of a Transmission Provider. This definition will apply to all NITS TSRs in this document.

7.4.2 Current Practice

7.4.2.1 Current TSR Classifications

7.4.2.1.1 *Freeze Date* TSRs

Currently, the historical allocation process calculates PTP impacts associated with a static list of TSRs that existed in OASIS systems as of the Freeze Date for the reference year between 6/1/2004 to 5/31/2005. Each TSR has an HBAA designated as a source and sink, and a specified number of MW transferred between these two Control Zones.

7.4.3 Proposed Solution

All TSRs included in the proposed solution are only applicable for calculating impacts that feed into the net allocation process.

7.4.3.1 Firm Transmission Service Reservations

FTSRs are defined as any of the TSR defined in the following sub-sections. The mechanics of the impact calculation for all FTSRs are described in detail in Section 7.7.3. Generally, if a TSR source represents a retired unit or complete set of retired units, that TSR is considered retired and excluded from the impact calculations.

The Table 7 provides a detailed summary.

Table 7 – Transmission Service Reservation (TSR) Categories

TSR	Inter-BA /Intra-BA	Scaling Granularity	Bucket	TDF Calculation
Active Freeze Date TSRs	Inter-BA	Control Zone	1	GTL
Active Post-Freeze-Date TSRs	Inter-BA	Control Zone	2	GTL
Active Pre & Post-Freeze-Date TSRs	Inter-BA	Control Zone	4	GTL
Active NITS TSRs	Inter-BA & Intra-BA	Control Zone	4	GTL

7.4.3.1.1 Active Freeze Date Inter-BA TSRs

Active Freeze Date Inter-BA TSRs will be included in buckets 1 and 4 to the extent a Freeze Date CMR or EOR is available to source the reservation.

7.4.3.1.2 Post Freeze Date Inter-BA TSRs

Post-Freeze-Date Inter-BA TSRs include only active 5 year Firm TSRs that have or have had Rollover Rights within their current 5-year effective window, that were not active as of the Freeze Date. These TSRs will only be applied in buckets 2 and 4.

7.4.3.1.3 Network Integrated Transmission Service (NITS) TSRs

NITS TSRs will be included as a bucket 4 (Transfers) option. Some entities plan their system using explicit NITS TSRs that designate Control Zone generation or specific clusters of generators to serve Control Zone load or specific clusters of load.

7.4.3.1.4 Inter-BA NITS TSRs

To the extent an Inter-BA TSR exists in both the list of Freeze Date TSRs as well as current OASIS systems, the TSR will be counted only once, and at the highest priority level applicable (bucket 1).

7.5 Transfers

7.5.1 Description

This design component aims to quantify impacts from generation serving load within the same BA, but not within in its native HBAA and not represented by an FTSR. The original impact calculation only accounts for generation serving load within its native HBAA. Impacts from serving load in a different HBAA (outside of TSRs) that are eligible for allocation are considered Transfers. Today, RTOs operate and plan their systems on an RTO granularity, meaning that transfers are occurring in planning and real-time operations. In addition, all RTOs plan to address local reliability and congestion issues; as well as, regional, economic, policy, and reliability issues. The proposed solution intends to introduce these constructs into the impact calculation.

7.5.2 Current Practice

There is currently no method to quantify impacts from Transfers.

7.5.3 Proposed Solution

The proposed rules allow Transfers by taking a multi-faceted approach; including HBAA based Reliability Transfers and BAA/RTO based transfers.

7.5.3.1 Bucket 3 (Reliability Transfers)

Reliability Transfers are transfers associated with an HBAA not having enough CMRs and/or FTSRs to meet its load obligation. This transfer will result in the long HBAA transferring MWs to the short HBAA on a pro-rata basis, up to the remaining BAA load. Reliability Transfers occur in bucket 3 and consist of HBAAs with excessive generation serving HBAAs with deficient generation (unserved load), as detailed in section 7.7.3.3.

7.5.3.2 Bucket 4 (BA/RTO based Transfers)

RTO or BAA based transfers occur in bucket 4, and all CMP entities must choose between an impact calculations that either aligns with a deliverability based planning approach, or aligns with a TSR based planning approach. Entities shall choose the method that appropriately aligns with their planning construct(s). As planning approaches evolve over time, the options for calculating bucket 4 impacts may need to be changed by the CMPWG to align with those processes.

All Transfers will be limited by contractual agreements and/or reliability limits. Due to the CMP entities planning processes being at the BAA or RTO level, there is agreement to phase out bucket 3 impacts over an 8 year period. The mechanics for the phase out approach is also described in Section 7.8.3.1.

Depending on the planning approach chosen by a particular entity, impacts from Transfers would be captured in one of the following two approaches.

7.5.3.2.1 NITS TSR Based Planning

BAs that use NITS TSRs to explicitly designate units to serve Control Zone load in their planning process can use the method prescribed in section 7.7.3.4.1 to calculate total impacts on a Flowgate.

7.5.3.2.2 Generation Deliverability Based Planning

BAs that use a generation deliverability based planning process can use the method prescribed in section 7.7.3.4.2 to calculate total impacts on a Flowgate.

7.6 Impact and Allocation Run Types

7.6.1 Description

The impact and allocation calculations are performed using load and topology (outages included) forecasts for future operating horizons. These allocations are used in forward-looking planning and market constructs, and are also used as inputs (among other values) to the ASTFC calculation.

7.6.2 Current Practice

Currently, the following forward-looking horizons are used to specify a load and topology forecast appropriate to the Run Type used in the impact and allocation calculations. Allocations for each Run Type are calculated in order:

1. April Seasonal Firm (effective 6 months to 18 months in advance)
2. October Seasonal Firm (effective 6 months to 18 months in advance)
3. Monthly Firm (effective next 6 consecutive months)
4. Weekly Firm (effective next 7 days)
5. 2 Day-Ahead Firm (effective day after tomorrow)
6. Day-Ahead Non-Firm (effective tomorrow)

Table 8 summarizes these Run Types and their schedule

Table 8 – Impact and Allocation Run Types

Allocation Run Type	Allocation Process Start	Range Allocated	Allocation Process Complete
April Seasonal Firm	Every April 1 at 8:00 EST	Twelve monthly values from October 1 of the current year through September 30 of the next year	April 1 at 12:00 EST
October Seasonal Firm	Every October 1 at 8:00 EST	Twelve monthly values from April 1 of next year through March 31 of the following year	October 1 at 12:00 EST
Monthly Firm	Every month on the second day of the month at 8:00 EST	Six monthly values for the next six successive months	2nd of the month at 12:00 EST
Weekly Firm	Every Monday at 8:00 EST	Seven daily values for the next Monday through Sunday	Monday at 12:00 EST
Two-Day Ahead Firm	Every Day at 17:00 EST	One daily value for the day after tomorrow	Current Day at 18:00 EST
Day Ahead Non-Firm	Every Day at 8:00 EST	Twenty-four hourly values for the next 24-hour period (Next Day HE1-HE24 EST)	Current Day at 9:00 EST

The forward-looking horizons uses the criteria below to determine which outages are included in the impact calculation for each run type.

- Run Types with a monthly granularity (Seasonal and Monthly Run Types) include an outage when the outage crosses the 3rd Wednesday of the month and spans at least half of the hours between 11:00 and 19:00 EST on that day, and exists for five (5) continuous days with in the given month
- Run Types with a daily granularity (2 Day-Ahead and Weekly run types) include an outage when the outage spans at least half of the hours between 11:00 and 19:00 EST on that operating day
- Run Types with an hourly granularity (Day-Ahead) include an outage when the outage is present over a particular hour

7.6.3 Proposed Solution

Since the ASTFC/AFC process does not have specific seasonal runs but rather monthly runs with an 18-month look-ahead, the monthly impact and allocation Run Type will be extended to the next consecutive 18 months and the seasonal run types will be eliminated. This will better align the ASTFC calculations time-period with the AFC calculation process. The impact and allocation calculations are performed as per below:

- Future Monthly (Monthly values effective 17 consecutive months starting month after next)
- Month-Ahead (Monthly value effective next month)
- Weekly (Seven daily values from next Monday through Sunday)
- 2 Day-Ahead (Daily value effective day after tomorrow)
- Day –Ahead (Twenty four Hourly values effective tomorrow)

Table 8 summarizes these proposed Run-Type changes

The forward-looking horizons will use the criteria below to determine which outages are included in the impact calculation for each Run Type. These changes should lead to improved topological accuracy.

- Run Types with a monthly granularity (Monthly) include an outage when the outage spans at least half of the hours (includes both profiled and continuous) of the month
- Run Types with daily granularity (2 Day-Ahead and Weekly Run Types) include an outage when the outage spans at least half of the hours between 06:00 and 22:00 EST on that day
- Run Types with hourly granularity (Day-Ahead) include an outage when the outage spans at least half of the minutes of the hour

7.7 Impact Calculation Methodology

7.7.1 Description

The Impact calculation refers to the calculation of FTSR and GTL impacts on Flowgates. The impact values are then used in determining the allocations on each Flowgate. CMP entities recognize that, in updating the Freeze Date process, respect for the historical usage of the transmission system is necessary while simultaneously respecting the current planning and operational constructs. In both the current and proposed CMP, the total impact on a Flowgate is defined as the sum of the impacts from FTSRs and native GTL impacts:

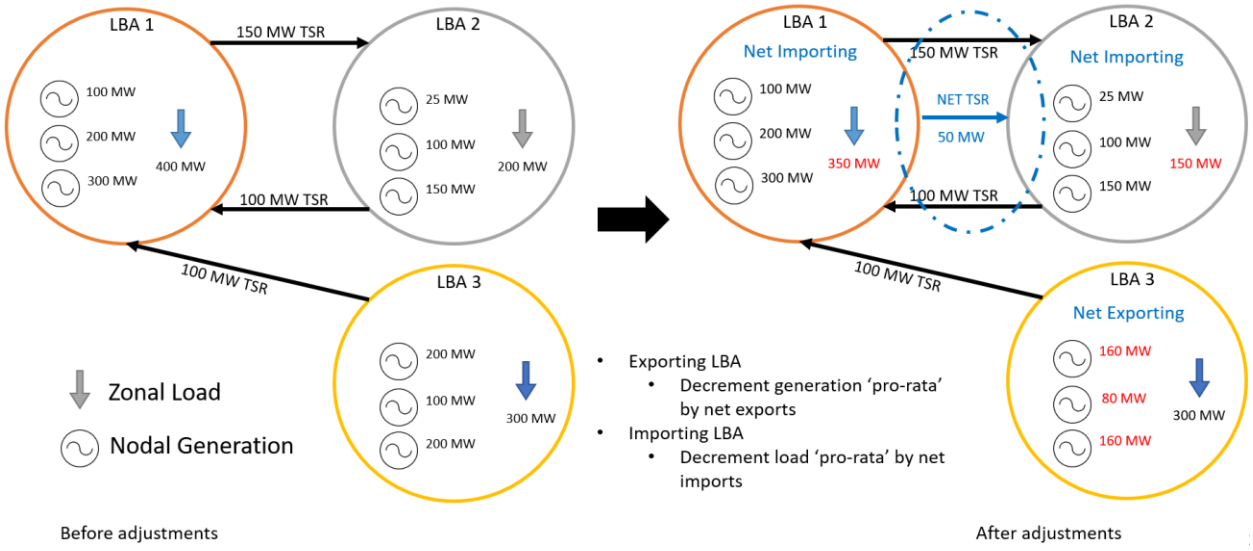
$$Total\ Impacts = Impacts_{FTSR} + Impacts_{GTL}$$

7.7.1.1 Applying TSRs and Interchange Transactions

7.7.1.1.1 Net Approach

When a BA calculates its real-time load obligation (load plus interchange), the interchange is determined by netting all of the real-time schedules (tags) that source or sink into that BAA, resulting in a net import or export. This is the case regardless where the tag is sourcing from (in the case of an import) or sinking to (in the case of an export). An example of netting is shown in Figure 3.

Figure 3 – Net TSR Approach

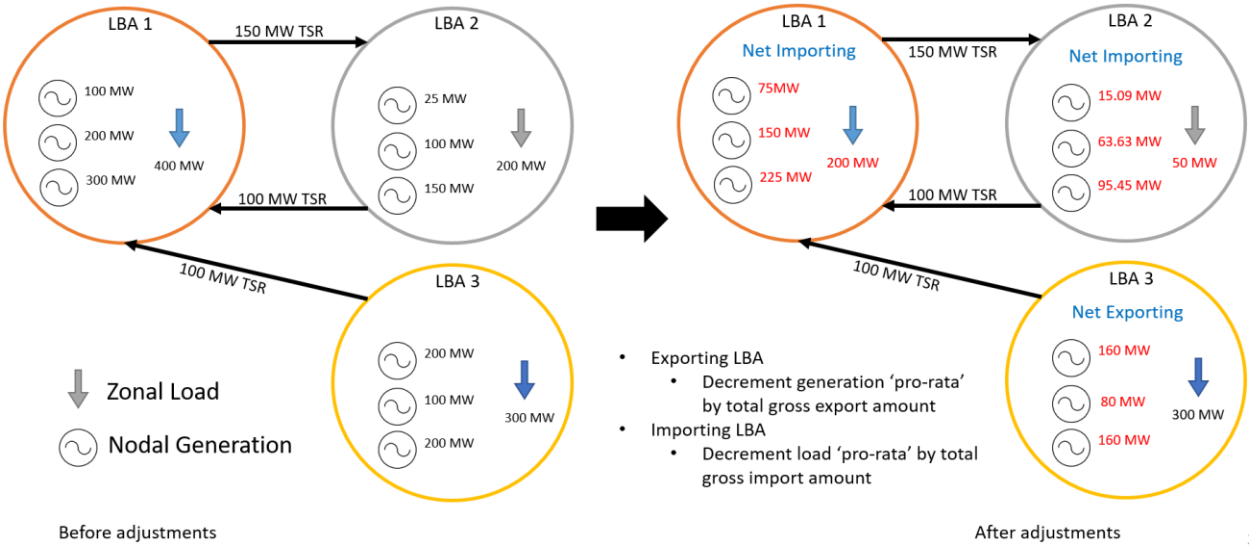


7.7.1.1.2 Directional Approach

The existing TLR process models tags on a directional basis in order to be able to explicitly identify the sources of forward impacts (Interchange Transactions or otherwise) for the purpose of curtailment. Using the net approach, while two tags may completely offset each other, both are subject to curtailment. To avoid double counting Interchange Transaction impacts and GTL impacts, these tags must scale down load (importing Interchange Transactions) and generation

(exporting Interchange Transactions) on a directional basis. This also is why current Market Flow calculations treat Interchange Transactions on a directional basis when calculating GTL impacts. In recognizing that the PTP impacts associated with each Interchange Transaction (supported by a TSR) are available in the IDC for curtailment, the Market Flow calculation decrements (pro-rata) load in the sink and generation in the source for each Interchange Transaction. An example of the directional approach is shown in Figure 4.

Figure 4 – Directional TSR Approach



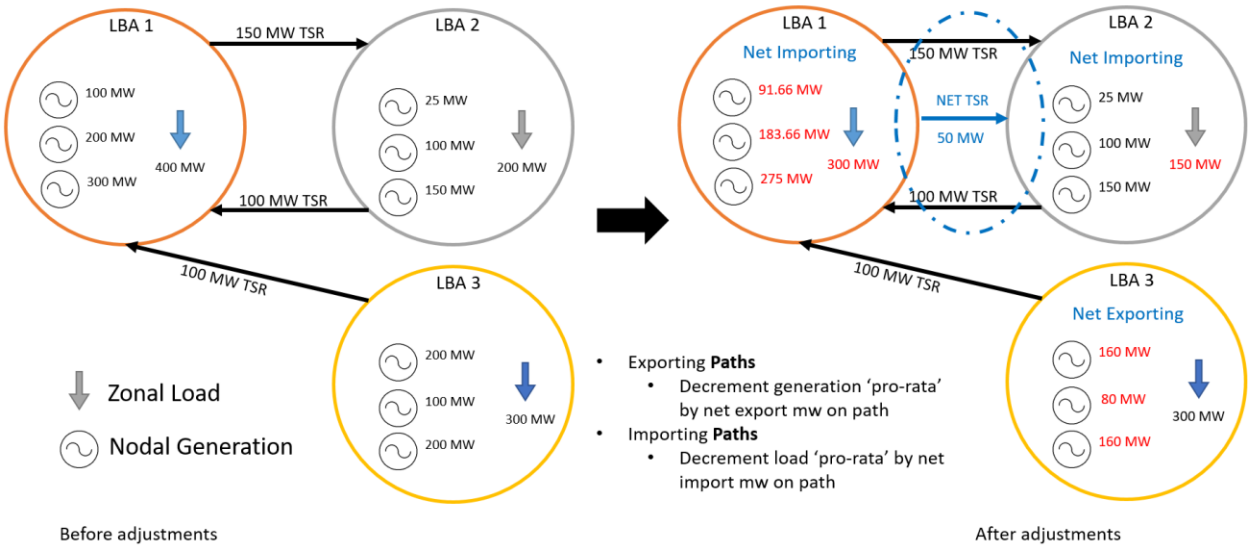
7.7.1.1.3 Hybrid of Methodologies

In order to accommodate the differences between the net and directional approaches in the NNL Impact calculation, a hybrid approach would net TSRs at a source/sink level. That is, for each unique path (source/sink pair), a net value will be calculated representing the net transfer for this path. This net value is only used for the purposes of performing system adjustments. TSR impacts are calculated for each TSR individually on a directional basis (A= BAA1, B=BAA2, A→B =unique path).

$$NetMW_{A\to B} = \sum MW_{A\to B} - \sum MW_{B\to A}$$

Each unique path for which a service point is a source or a sink is classified as either net importing or net exporting for each service point. In the example above, if the $NetMW_{A\to B}$ is greater than zero, then $NetMW$ is exporting from A and importing into B. The sum of *all* net exporting paths from A decrement generation in A, and the sum of *all* net importing paths into A will decrement load in A. This scaling approach applies to all service points. Each path will be counted twice, once for the source and once for the sink. Because it incorporates some concepts of a net approach and some of the directional approach, it has been termed "the hybrid approach". An example of the hybrid approach is shown in Figure 5.

Figure 5 - Hybrid TSR Approach



7.7.1.2 Generation-to-Generation (GTG) TDF Calculation

One common way to perform a Transfer Distribution Factor (TDF) calculation is to calculate a Generation-to-Generation (GTG) TDF, which is derived by taking the aggregate source Weighted Generation Shift Factor (WGSF) and subtracting the aggregate sink WGSF. The impact on a Flowgate is then this TDF multiplied by the MW amount of the TSR. A GTG calculation is generally used when trying to describe the impact of the curtailment of an Interchange Transaction, as generation in the sink is increased while generation in the source is decreased.

7.7.1.3 Generation-to-Load (GTL) TDF Calculation

Another common way to perform a TDF calculation is to calculate a GTL TDF, which is derived by taking the aggregate source WGSF and subtracting the aggregate sink Weighted Load Shift Factor (WLSF). This models the impact of an injection of one MW at the source (generation) and a withdraw of one MW at the sink (load). The impact on a Flowgate is then this TDF multiplied by the MW amount of the TSR. A GTL calculation is generally used when trying to describe the impact of generation serving load.

7.7.2 Current Practice

At a high level, impacts are currently being calculated using the following steps:
For each Control Zone

1. Freeze Date TSR impacts are calculated using a TSR source to sink transfer TDF that is multiplied by TSR MW ($Impacts_{FTSR} = TDF * MW_{TSR}$). The TDF value is calculated using the GTG method
2. Net interchange is determined by applying the Net Approach at an HBAA level, described in section 7.7.1.1.1. This approach quantifies the net import and export of each HBAA based on the list of Freeze Date TSRs

3. If net interchange is negative, load is adjusted by net interchange ($Adjusted\ Load = Load + Net\ Interchange$). If net interchange is positive, neither load nor generation is adjusted
4. Freeze Date DNRs are dispatched in priority order up to adjusted load and GTL impacts are calculated
5. Unserved load in step 5 is then served slice of system by Post-Freeze-Date generators (both DNRs and EORs). Any load remaining after all generation within the HBAA has been dispatched goes unserved. GTL Impacts from Post-Freeze-Date generators are added to those calculated in step 4

Currently, forward and reverse impacts are not netted. Both forward and reverse impacts are allocated separately as described in the current practice of section 7.8.2.

7.7.3 Proposed Solution

For purposes of calculating net allocations, impact calculations are divided into four buckets and each bucket's GTL impacts and FTSR impacts are calculated. Impacts within each bucket are calculated in order from buckets 1 to 4. Table 9 summarizes which generators are allowed to participate in the dispatch for each bucket.

Table 9 - Resources used for serving TSRs and Load by Bucket

Serving	Bucket 1	Bucket 2	Bucket 3	Bucket 4 (RTO Method)	Bucket 4 (TSR method)
Firm TSR	All Freeze Date CMR/EORs	All Remaining CMR/EORs	N/A	All CMR/EORs	All CMR/EORs
Load	All Freeze Date CMRs	Post-Freeze-Date CMRs	All Remaining CMRs	All CMRs	NITS TSRs/ Scheduling Rights

7.7.3.1 Bucket 1

7.7.3.1.1 Serve Active Freeze Date Inter-BA TSRs

All Freeze Date resources (CMRs and EORs) will be used to serve any active Freeze Date Inter-BA TSRs. FTSR Impacts will be calculated on a directional basis for each FTSR individually by multiplying the FTSR MW by the TDF on each Flowgate. More information on FTSRs can be found in section 7.4.3.1. TSR MWs will be applied to scale generation and load using the hybrid approach as described in section 7.7.1.1.3. Generators will be scaled down on a pro-rata basis for exports, and load will be scaled down on a pro-rata basis for imports.

7.7.3.1.2 Serve HBAA Load With HBAA Freeze Date CMRs

Any HBAAs that still have unserved load after TSRs are applied will then dispatch unused Freeze Date CMRs within that HBAA in merit order to serve their load. More details on the merit order

can be found in section 7.3.3. GTL Impacts will be calculated for each generator by multiplying the dispatched generator MW by the Generation-to-Load Distribution Factor (GLDF) on each Flowgate.

7.7.3.2 Bucket 2

7.7.3.2.1 Serve Remaining Active Inter-BA TSRs

All remaining resources (CMRs and EORs) will be used to serve all remaining active Inter-BA TSRs. FTSR Impacts will be calculated on a directional basis for each TSR individually by multiplying the FTSR MW by the TDF on each Flowgate. More information on TSRs can be found in section 7.4.3.1. TSR MWs will be applied to scale generation and load using the hybrid approach as described in section 7.7.1.1.3. Generators will be scaled down on a pro-rata basis for exports, and load will be scaled down on a pro-rata basis for imports.

7.7.3.2.2 Serve HBAA Load With HBAA Post-Freeze-Date CMRs

Any HBAAs that still have unserved load after TSRs are applied will then dispatch all unused Post-Freeze-Date CMRs within that HBAA in merit order to serve their load. More details on the merit order can be found in section 7.3.3. GTL Impacts will be calculated for each CMR by multiplying the dispatched CMR MW by the GLDF on each Flowgate.

7.7.3.3 Bucket 3 (HBAA Reliability Transfers)

After the bucket 1 and bucket 2 calculations, each BA could be left with a number of long HBAAs (excess CMR MWs) and a number of short HBAAs (unserved load). In this scenario, the entity will be able to serve any remaining load with remaining CMRs on a pro-rata basis.

1. Create an aggregate load made up as the sum of all short HBAA's remaining load
2. Calculated a WLSF for the aggregate load on each Flowgate
3. Serve that load with each CMR in the BAA with leftover capacity on a MW weighted, pro-rata basis
4. Calculate a GLDF for each CMR on each Flowgate (GLDF = GSF – WLSF)
5. Calculate the impact of each CMR in the BAA serving the aggregate load as the sum of all generator MW multiplied by its GLDF on each Flowgate
    a. MISO will follow the Midwest-South Contract Path limit rules as detailed later in this section.

7.7.3.4 Bucket 4 (BA/RTO Dispatch method)

This proposal prescribes two methods for entities to use when calculating bucket 4 impacts. An entity must choose one of the methods on an annual basis, provided that entity has a similar method employed in their planning process. The following describes the two different calculation methods.

7.7.3.4.1 NITS TSR Method

This calculation effectively mimics a TSR based planning approach where Post-Freeze-Date Inter-BA TSRs and NITS TSRs are used to calculate impacts on Flowgates. This method applies to entities that plan their system using a NITS TSR based approach.

i. For each Control Zone, determine interchange from Post-Freeze-Date Inter-BA TSRs using the hybrid approach defined in section 7.7.1.1.3.
ii. For each Control Zone, decrement all CMR and EOR Generation proportionally by the sum of all exporting Inter-BA paths and decrement load by the sum of all importing Inter-BA paths.
iii. Calculate bucket 4 PTP impacts of each Inter-BA TSR on each Flowgate. The impact on each Flowgate is equal to the TSR MW multiplied by the TDF for each Post-Freeze-Date TSR path (TDF = WGSF_Source - WLSF_Sink).
iv. Each Control Zone is assigned an export limit for each unique Intra-BA TSR path (source/sink pair) to the other Control Zones within the BA. The export limit of any given Intra-BA export path is calculated as the sum of all exporting firm Intra-BA NITS TSRs along that Intra-BA path.
v. On a BAA basis, dispatch remaining CMRs in merit order to serve all BAA load while respecting each Control Zone's exporting limits established in step (iv).
vi. Calculate bucket 4 GTL impact of each generator on each Flowgate. The impact on each Flowgate is equal to the generator MW multiplied by the GLDF for each path along which the generator is serving load (GLDF = GSF - CZ_WLSF, for each path).
vii. Calculate the total bucket 4 GTL impact on each Flowgate as the sum of step vi for all generators.
viii. Calculate the total bucket 4 impact on each Flowgate as the sum of steps iii and vii.

Note that an acceptable outcome of this process could be unserved load.

7.7.3.4.2 RTO Merit Order Dispatch Method For Net Allocations

In this calculation, all BAA CMRs are being dispatched to serve all BAA load. In many RTO planning approaches, there is no Control Zone construct. In fact, many deliverability-based tests are meant to ensure a uniform level of robustness irrespective of HBAA or Control Zone boundaries. This impact calculation is comprised of the following:

i. For each Control Zone, determine interchange from Post-Freeze-Date Inter-BA TSRs using the hybrid approach defined in section 7.7.1.1.3.
ii. For each Control Zone, decrement all CMR and EOR Generation proportionally by the sum of all exporting Inter-BA paths and decrement load by the sum of all importing Inter-BA paths.
iii. Calculate bucket 4 PTP impacts of each Inter-BA TSR on each Flowgate. The impact on each Flowgate is equal to the TSR MW multiplied by the TDF for each Post-Freeze-Date TSR path (TDF = WGSF_Source - WLSF_Sink).
iv. On a BAA basis, dispatch remaining CMRs in merit order to serve all BAA load.

v. Calculate bucket 4 GTL Impact on each Flowgate. The GTL impact on each Flowgate is equal to the sum of each generator's MW multiplied by its GLDF, where the GLDF is calculated as the GSF minus the BAA WLSF (or regional load shift factor in the presence of Contract Path limits).
    a. MISO will follow the Midwest-South Contract Path limit rules as detailed later in this section.

vi. Calculate the total bucket 4 impact as the sum of steps iii and v.

7.7.3.5 Calculating Net Prevailing Bucket 4 Impacts

The Prevailing Bucket 4 (PB4) impacts represent the change or delta impact between HBAA and BAA planning dispatch. HBAA based net impacts are calculated as the sum of the net impacts within buckets 1, 2 and 3. The PB4 impacts are calculated as the difference between the BA's net bucket 4 impacts and the sum of all HBAA net impacts. The allocation calculation described in section 7.8.3 uses the net PB4 impacts, not the total net bucket 4 impacts.

Net PB4 impacts are calculated for both Threshold and Non-Threshold designations:

$$Net\ Threshold\ PB4\ Impacts = Net\ Threshold\ B4\ BA\ Impacts - Net\ Threshold\ HCA\ Impacts$$

$$Net\ Non-Threshold\ PB4\ Impacts = Non-Threshold\ Net\ B4\ BA\ Impacts - HCA\ Non-Threshold\ Net\ Impacts$$

$$Net\ PB4\ Impacts = Net\ Threshold\ PB4\ Impacts + Net\ Non-Threshold\ PB4\ Impacts$$

Net PB4 impacts of an entity are capped once the sum of the net HBAA impacts and the PB4 net impacts exceed the total net bucket 4 impacts. Net Non-Threshold PB4 impacts are capped first before the net Threshold PB4 impacts if the sum of the net B1, B2, B3, and PB4 impacts exceeds the total net bucket 4 impacts.

The PB4 calculation differs for different periods after the effective date of this agreement. These periods are defined as years 0 to 4, years 4 to 8, and beyond year 8. The calculation proposed in the period between years 0 to 4 allows for a transition of firm rights calculation to BAA based planning dispatch from the HBAA dispatch, with a phase out mechanism in bucket 3. The total net HBAA impacts (sum of buckets 1, 2, and 3) have a higher priority than net bucket 4 impacts.

In years 0 to 4, only net PB4 impacts providing forward flow are considered for allocation and net PB4 impacts providing counter-flow are excluded, as counter-flows from the BAA dispatch should not be eligible for allocation since all firm load is served in buckets 1, 2, and 3. In this period, PB4 is intended to be incremental, and should not reduce the allocation (covered in section 7.8.3) received from buckets 1, 2, and 3 in years 0 to 4. However, as bucket 3 is phased out, load previously served in bucket 3 can only be served in bucket 4. Any counter-flows associated with that load in bucket 3 would be non-existent if counter-flows are not allowed in PB4. Therefore, in years 4 to 8, 50% of any

net PB4 impacts providing counter-flow, and 100% of any net PB4 impacts providing counter-flow after year 8 will be included in the overall calculation. This is summarized below:

- For year 0 to 4: net PB4 impacts are floored to zero if providing counter-flow
- For year 4 to 8: net PB4 is floored to 50% if providing counter-flow
- For year 8: net PB4 impacts are not floored and 100% considered

7.7.3.6 MISO Regional Transfer

Impact calculations will respect the MISO South – MISO Midwest transfers up to the Contract Path Capacity (CPC) in both directions in buckets 3 & 4. When the transfer exceeds the CPC in bucket 3 or bucket 4, re-dispatch of MISO South & Midwest generation is performed to maintain the CPC and to satisfy the unserved load.

Any Inter-BA FTSRs that exist between MISO South and external entities without ties to the MISO South, are mapped to MISO Midwest generation which is scaled down proportionally.

The MISO Regional Transfer can be calculated as:

$$\text{MISO Regional Transfer} = \text{South Generation Dispatch} - \text{South Load} + \text{Regional Pseudo} - \text{Tie Impacts}$$

Where the South generation dispatch has been adjusted for exports from FTSRs that source from MISO South, and the South load has been adjusted for imports that sink into MISO South.

Regional Pseudo-Ties are generation or load within MISO that exist in Midwest region but for purposes of the Regional Transfer, should be assigned to the South region or vice versa to reflect ownership.

Then we can see if this transfer, in either direction, is over the CPC.

If South to Midwest transfer > CPC Then

Decrement South CMRs on a pro-rata basis and increment Midwest CMRs on a pro-rata basis until the transfer is equal to the CPC, or no more Midwest CMRs are available. If there is any remaining transfer above the CPC it, then the South load will be reduced by the remaining transfer exceeding the CPC.

If Midwest to South transfer > CPC Then

Decrement Midwest CMRs on a pro-rata basis and increment South CMRs on a pro-rata basis until the resulting transfer is equal to CPC, or no more South CMRs is available. If there is any remaining transfer above the CPC, then the Midwest load will be reduced by the remaining transfer exceeding the CPC.

The impacts are calculated using the regional GLDF values for the CMRs serving the regional load. Generation serving load in the other region will have a GLDF calculated using the GSF from the sourcing region and WLSF from the sinking region.

7.8 Allocation Methodology

7.8.1 Description

This section describes how we calculate allocations given the calculated impacts that exist from all buckets on each Flowgate. Generally, impacts that are eligible for allocating are categorized using different attributes that are important in operational and planning processes. These attributes include, but are not limited to:

- Curtailment Thresholds
- Directional or net parallel flows
- Treating coordinated and owning entities differently than third parties
- Run Types (Section 7.6)

Using these attributes, the allocation process will ensure:

1. Allocations respect Flowgate limits, with a few exceptions specific to directional allocations
2. Coordinating entities receive the benefits of participating in the CMP by allocating their Non-Threshold impacts

Allocations are used to determine Flowgate limits such as FFL (Section 7.12), ASTFC (Section 7.13) and FFE (Section 7.14).

7.8.2 Current Practice

7.8.2.1 Firm Allocations

There are two types of Firm Allocations, Down-to-Zero Allocations and Threshold Allocations. Firm Allocations are calculated for each Run Type 1 through 5.

7.8.2.1.1 Firm Down-to-Zero Allocation

The following procedure is used to calculate a Firm Down-to-Zero Allocation on each Flowgate.
For each direction (forward and reverse):

1. The adjusted Flowgate rating is equal to the Flowgate Rating less the Transmission Reliability Margin (TRM)
2. All entities allocate all Threshold impacts
3. If there is no remaining Flowgate capacity after allocating all Threshold impacts:
    a. The Flowgate is considered over allocated (more allocations than Flowgate capacity)
    b. The owner is allocated the Capacity Benefit Margin (CBM)
    c. Proceed to step 7
4. If the total of the Reciprocal Entities Non-Threshold impacts plus the CBM exceeds the remaining capacity on the Flowgate:

a. The owner will receive the full CBM and then any remaining capacity (which could be zero) is allocated on a pro-rata basis using the Non-Threshold impacts.
b. Proceed to step 7

5. The RE's Non-Threshold impacts plus the CBM is less than the remaining capacity on the Flowgate:
    a. The CBM and Non-Threshold impacts are fully allocated
6. Any remaining excess capacity is considered firm and allocated to Reciprocal Entities based on their Historical Ratio ensuring that the owner will receive at a minimum the CBM amount. Excess allocation is further explained in Section 7.9.2.
7. The allocation process is finished.

7.8.2.1.2 Firm Threshold Allocation

On each Flowgate, the Firm Threshold Allocation is calculated by taking the Firm Down-to-Zero Allocation and subtracting any Reciprocal Entities Non-Threshold impacts that were allocated in steps 4 or 5. The Firm Threshold Allocation is calculated in both the forward and reverse direction.

7.8.2.2 Non-Firm Allocation

There are two types of Non-Firm Allocations, Non-Firm Down-to-Zero Allocations and Non-Firm Threshold Allocations. Non-Firm Allocations are only calculated for Run Type 6.

7.8.2.2.1 Non-Firm Down-to-Zero Allocation

The following procedure is used to calculate a Non-Firm Down-to-Zero Allocation:

1. The adjusted Flowgate rating is equal to the Flowgate Rating less the Transmission Reliability Margin (TRM)
2. All entities allocate all Threshold and Non-Threshold impacts
3. Any remaining excess capacity is considered firm and allocated to Reciprocal Entities based on their Historical Ratio ensuring that the owner will receive at a minimum the CBM amount. Excess allocation is further explained in Section 7.9.2.
4. The allocation process is finished.

7.8.2.2.2 Non-Firm Threshold Allocation

The Non-Firm Threshold Allocation is calculated by taking the Non-Firm Down-to-Zero Allocation and subtracting any Non-Threshold impacts that were allocated in steps 4 or 5. The Non-Firm Threshold Allocation is calculated in both the forward and reverse direction.

7.8.3 Proposed Solution

There will be two methods of allocating impacts. Directional allocations (and their inputs) will continue to be calculated as they are today for use in calculating FFL and ASTFC values. To align with the Market-to-Market settlements construct, this process will also calculate a new set of allocations that will include net Down-To-Zero impacts and respect the Flowgate limit on a net basis.

7.8.3.1 Impact Classifications

The allocation process consists of different classifications of impacts that are differentiated based on impact bucket, Curtailment Threshold, directional or net designations, and entity type.
Within each bucket, the following sources of impacts will exist:

1. Bucket one – historical impacts
    a. GTL impacts sourcing from Freeze Date CMRs
    b. PTP impacts sourcing from active Freeze Date FTSRs
2. Bucket two – post market-integration impacts
    a. GTL impacts sourcing from Post Freeze Date CMRs
    b. PTP impacts sourcing from active Post-Freeze-Date FTSRs
3. Bucket three – HBAA Reliability Transfers to make sure all BAA load is served. Bucket 3 will phase out after 8 years
    a. 6/1/2022-5/31/2026: 100 % of bucket 3 impact is assigned on each Flowgate
    b. 6/1/2026-5/31/2030: 50 % of bucket 3 impact is assigned on each Flowgate
    c. After 6/1/2030 bucket 3 is terminated and not assigned on any Flowgates
4. Prevailing Bucket Four – NITS TSR Method (Section 7.7.3.4.1) & RTO Merit Order Dispatch Methods (Sections 7.7.3.4.2 and 7.7.3.4.1)

There will be four different entity types that are used to distinguish impacts from each entity:

1. An Owning Reciprocal Entity (Owner)
2. A Non-Owning Reciprocal Entity (CMP RE)
3. A Non-Reciprocal CMP Entity (CMP Non-RE)
4. A Third Party

Impacts are further divided into Threshold and Non-threshold. In both directional and net allocation calculations, Threshold Impacts are allocated to all entities and Non-Threshold impacts are allocated to CMP entities only.
Non-Threshold impacts from Third Parties are not eligible for allocation due to the following:

1. A Third Party's Non-Threshold impacts are not curtailable in real-time under any current congestion management process (TLR or M2M) as of the writing of this whitepaper
2. Allocating Third Party non-threshold impacts would negatively and unnecessarily affect the firm allocations received by coordinating entities that *will* be subjected to curtailment in real-time, as well as negatively and unnecessarily affect the FFE awarded to the Non-Monitoring RTO in the M2M Settlements processes

The result of these different classifications are twelve classes of impacts that are eligible for allocation. These are summarized in

Table 10.

Table 10 – Impact Classifications and Priorities

	Bucket 1				Bucket 2				Bucket 3				PB4			
Net Impact	Owner	CMP RE	CMP Non-RE	Third Party	Owner	CMP RE	CMP Non-RE	Third Party	Owner	CMP RE	CMP Non-RE	Third Party	Owner	CMP RE	CMP Non-RE	Third Party
Threshold	Priority Rank	1			2				3				9	10		
Non- Threshold		4		N/A	5	6		N/A	7	8		N/A	11	12		N/A

7.8.3.2 Net Allocations (Down-To-Zero): Used for Market-to-Market process

The allocation process on each Flowgate will consist of the following steps. Using net impacts in each impact category:

1. Adjusted Flowgate Capacity = Flowgate Capacity – TRM – CBM
2. Allocate the sum of impacts 1 through 12
3. If there is excess capacity left after all the impacts are allocated, then the excess capacity is granted as described in section 7.9.3. Proceed to step 7
4. If the total sum of allocated impacts is greater than the Flowgate Rating, curtail impacts staring with the lowest priority (highest numeric) impact class that contains net positive impacts until the Flowgate is under the limit. If an entity has a net negative impact within a given impact class, then that entity's impacts within that class will not be curtailed as the entity is providing a net benefit to all entities.
5. Repeat step 4, iterating through each impact class in reverse priority order, until allocated impacts are less than the adjusted Flowgate Rating. Each step of curtailment removes all of the net forward impacts within the curtailed impact class
6. Allocate the remaining capacity on a pro-rata basis using the curtailed impacts within most recent impact class as the basis
7. CBM is granted to Flowgate owner

Section 7.14.3 shows additional details on how this net allocation value will be used in establishing transmission entitlements for use in Market-to-Market constructs.

7.8.3.3 Down-To-Zero Directional Allocations Used in ASTFC Calculation

Status Quo.

7.8.3.4 Threshold Directional Allocations Used in FFL Calculation

Status Quo.

7.9 Allocating Excess Flowgate Capacity

7.9.1 Description

Allocating excess Flowgate capacity is done on a Flowgate after all entities have allocated their calculated Threshold and Non-Threshold impacts from each bucket as described in Section 7.8.3.

7.9.2 Current Practice

Excess Flowgate capacity is socialized between reciprocal entities based on their Historical Ratio on the Flowgate.

7.9.3 Proposed Solution

For net allocations, the owner of the Flowgate will receive allocations for any excess Flowgate capacity after the net allocation processes. In most planning processes, the Flowgate owner is ultimately responsible for necessary upgrades not associated with neighboring interconnection impacts that fall below specified impact thresholds. This will ensure the owner of the Flowgate has the first priority on its own transmission system.

For directional allocations, status quo.

7.10 Higher-of-Logic

7.10.1 Description

Higher-of-Logic chooses the highest allocation value across certain Run Types (detailed in section 7.6) to ensure that previously calculated allocations are not reduced. Allocations that represent an operational horizon often change as that operating horizon approaches due to outages and other changes in assumptions. The purpose of Higher-of-Logic is to retain the allocation value that may have been used by an entity to make commitments such as the selling of Transmission Service or establishment of Flowgate limits for use in forward markets.

7.10.2 Current Practice

Higher-of-Logic is applied to the Seasonal through 2DA Run Types. After the allocation of each Run Type is calculated, Higher-of-Logic chooses the maximum allocation of each Reciprocal Entity between the Seasonal Run Types through the Run Type that was previously calculated, and uses that as the allocation for each Run Type. Provisions exist today that allow a rerun or reset of Higher-of-Logic with mutual agreement from the affected entities.

7.10.3 Proposed Solution

This proposal changes the Higher-of-Logic for net allocations to choose the maximum allocation amongst the Month-Ahead, Weekly, and 2DA allocation Run Types. This maximum net allocation is used in the FFE calculation. Future Monthly runs will not be included in the Higher-of-logic for net allocations.

Given the Run Type changes, the Higher-of-Logic for directional allocations will choose the maximum allocation amongst the Future Monthly, Month-Ahead, Weekly, and 2DA allocation Run Types. This maximum directional allocation is used in the FFL and ASTFC calculations. This effectively maintains a status quo application of the Higher-of-Logic given the changes to the Run Types.

7.11 Allocation Sharing & Transfers

7.11.1 Description

In the Firm Transmission Service Reservation approval process when a Reciprocal Entity does not have enough ASTFC to approve a Firm TSR, the Congestion Management Process (CMP) allows another Reciprocal Entity to transfer or provide their unused firm allocations to this deficient entity, with the goal of fully using the available allocations and the transmission system. This process is knows as Allocation Sharing & Transfers.

The Reciprocal Entity who needs additional ASTFC is referred to as the Deficient Reciprocal Entity (DRE). The Reciprocal Entity giving the allocations for granting the DRE Firm reservation is referred as Impacted Reciprocal Entity (IRE).

7.11.2 Current Practice

When approving a new Firm TSR, Allocation Transfers can occur when a DRE requests daily, weekly, monthly, or yearly allocations from the IRE more than 7 days before the start of the Firm TSR. Allocations for the use in calculating FFEs and FFLs of the IRE are reduced, and the allocations of the DRE are increased by the amount transferred.

Allocation Sharing occurs for requests that occur within 7 days of the Firm TSR. When allocations are shared, the DRE and IRE allocations used in calculating FFEs and FFLs are not adjusted (IRE entity allocations are not reduced, and DRE allocations are not increased). DRE allocations are adjusted before calculating ASTFC, however, and can be used for approving the Firm TSR.

7.11.3 Proposed Solution

Status quo as applied to the directional allocations used in the FFL and ASTFC process.

The Market Based Operating Entities believe that the current process of Allocation Transfers helps to fully utilize the transmission system, but it has unintended consequences in the M2M Settlements process as the IRE providing the net allocations to the DRE for approving the DRE's Firm TSR has to reduce its net allocation, which then reduces the IRE's FFE. Since an Interchange Transaction will represent this approved TSR in real-time, and the FFE calculations subtract the impact of Interchange Transactions from the 2DA allocation, the FFE will account for the approved TSR as they are currently calculated. Thus, allocations used in the FFE calculation will no longer be adjusted by Allocation Transfers in order to preserve the rights of the IRE.

7.12 Firm Flow Limit (FFL)

7.12.1 Description

FFLs are be used to quantify a Market Based Operating Entity's firm and non-firm Market Flow in real-time. Under a TLR, these firm and non-firm Market Flows play a role in the determination of a Market Based Operating Entity's relief obligation. FFLs are calculated in the forward direction for use in a TLR that is called in the forward direction. FFLs are calculated in the reverse direction for use in a TLR that is called in the reverse direction. How FFLs and other non-firm limits are used in real-time are further described in section 7.15. Because real-time PTP impacts of Interchange Transactions are quantified by the IDC and curtailable under a TLR, an FFL should be a GTL based number so that impacts are not double counted.

7.12.2 Current Practice

7.12.2.1 Firm Flow Limit (FFL)

For Coordinated Flowgates that are not Reciprocally Coordinated Flowgates, a Market-Based Operating Entity can use one of the two methods to establish a Firm Flow Limit. A Market-Based Operating Entity can use day-ahead unit commitment and its associated Security Constrained Economic Dispatch (SCED). Market-Based Operating Entity's GTL and unused Firm Transmission Service impacts, up to the Flowgate Limit, on the Coordinated Flowgate.

For Reciprocally Coordinated Flowgates, Market-Based Operating Entities use the GTL and unused Firm Transmission Service impacts method to calculate the FFLs. FFLs are calculated using Threshold values only (Impacts, Allocations, etc). Non-Market Operating Entity's do not have an obligation to calculate FFLs and instead curtail Generation with GLDF at or above the Curtailment Threshold and Tags with TDF at or above the Curtailment Threshold when TLR 5B is called, and curtail non-firm tags when TLR 3B is called.

On each RCF, an FFL is calculated in both the forward and reverse direction. The following inputs are used in calculating an FFL:

- The 2DA Allocation is a daily number (one value for the operating day), calculated 2 days before the operating day and is the result of the Higher-of-Logic
- The DA GTL is the historical GTL impacts and it is calculated 1 day before the operating day and it is a hourly number (24 values for the operating day)
- The Forward Schedule Impact is calculated using the Firm Interchange Transactions and it is calculated four times in an hour on a 15 minute schedule

When the 2DA Forward Allocation less the Forward Schedule Impact exceeds the DA Forward GTL, all active Firm Interchange Transactions are subtracted from the 2DA Forward Allocation to establish the Forward FFL.

Post-Freeze-Date TSRs are not included in the 2DA Allocation calculation, however, the Firm Interchange Transactions that these TSRs support are included in the Forward Schedule Impact. Freeze Date TSRs (including retired TSRs) are included in the 2DA Allocation calculation, but as they retire, the Firm Interchange Transactions that they used to support are no longer included in the Forward Schedule Impact. This mismatch between which TSRs are captured in the 2DA Allocation and which Interchange Transactions are captured in the Forward Schedule Impacts has become more apparent as the Freeze Date moves further into the past.

7.12.2.1.1 Forward FFL

The forward FFL is calculated as:

If (2DA Forward Allocation – Forward Schedule Impact) >= DA Forward GTL
Forward FFL = 2DA Forward Allocation – Forward Schedule Impact)
Else If(2DA Forward Allocation – Forward Schedule Impact) < DA Forward GTL
Forward FFL = minimum (DA Forward Gen-To-Load, Two Day Ahead Forward Allocation)

7.12.2.1.2 Reverse FFL

The Reverse FFL is calculated as:

Reverse FFL= minimum (2DA Reverse Allocation, DA Reverse GTL)

7.12.2.2 Non-Firm ED6 Limit

The Non-Firm Economic Dispatch 6 (ED6) limit is calculated in both directions using the formula below

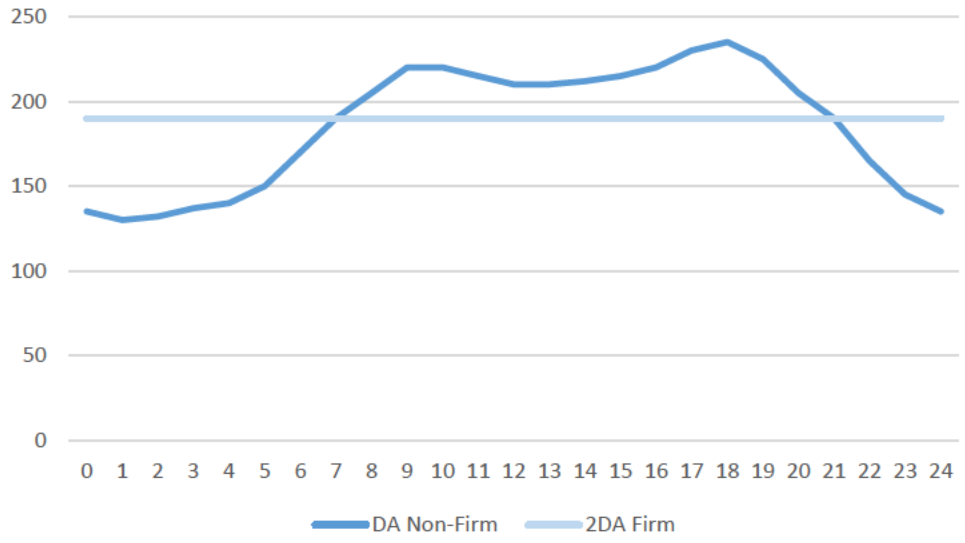
Non-Firm ED6 = Absolute value of (DA Non-Firm Allocation – 2DA Firm Allocation)

Where:

- The 2DA Firm Allocation is a daily number (one value for the operating day), calculated 2 days before the operating day and is the result of the Higher-of-Logic. It represents the firm historical rights to the transmission system of each entity on each Flowgate.
- The DA Non-Firm Allocation is an hourly number, and is calculated one day before the operating day. It represents the anticipated historical use for the next day by each entity on each Flowgate.

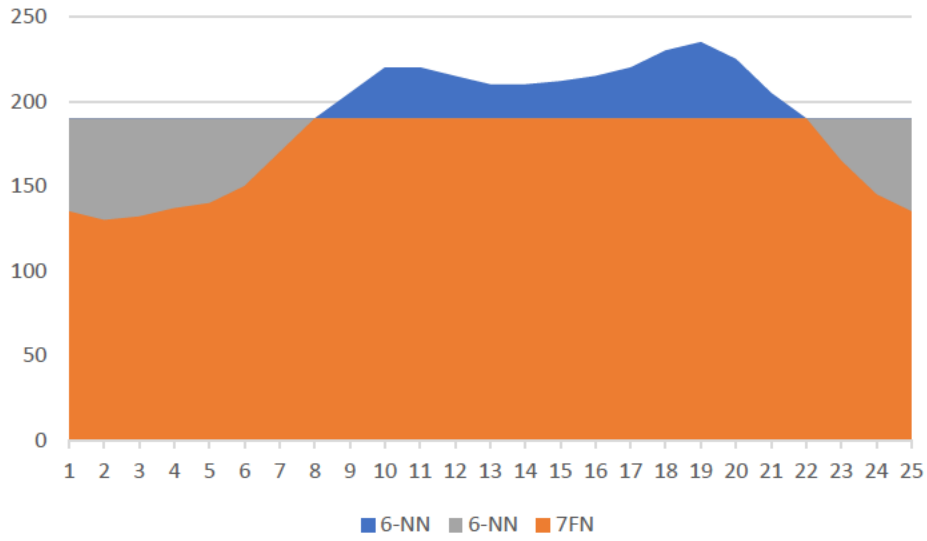
For each entity on each Flowgate, the ED6 calculation compares the 2DA Firm Allocation to the DA Non-Firm Allocation. Figure 6 shows an example of this comparison.

Figure 6 - 2DA Firm vs DA Non-Firm Allocation



In this example, the result of the ED6 calculation is the shown in Figure 7. ED6 is assigned the 6-NN Transmission Service priority (priority 6). There are two types of ED6. One type is when the DA Non-Firm Allocation exceeds the 2DA Firm Allocation. This is shown in blue in Figure 7. In this scenario, not all Non-Threshold impacts were able to be allocated in the 2DA Allocation without exceeding the Flowgate Rating, and so the difference between the DA Non-Firm Allocation and 2DA Firm Allocation is a portion of these unallocated Non-Threshold impacts. However, these unallocated impacts are considered firm by each individual entity. Thus, while they are not allocated and reflected in the 2DA Firm Allocation, they are assigned the highest level of Non-Firm Transmission Service priority (6-NN).

Figure 7 – Firm and Non-Firm Limits



The second type of ED6 is when the 2DA Firm Allocation exceeds the DA Non-Firm allocation. This is shown in light grey in Figure 7. Here, on a Day Ahead basis, the entity is not expecting to use the amount of transmission it historically has the rights to use. The ED6 limit exists to recognize the unused historical transmission rights of that entity. While it wouldn't be appropriate to grant this as a Firm Allocation, the fact that the entity was participating in Flowgate coordination to manage congestion on a forward looking basis justifies awarding the ED6 as the highest level of Non-Firm Transmission Service (6-NN).

7.12.3 Proposed Solution

Status Quo.

7.13 Available Share of Total Flowgate Capability (ASTFC)

7.13.1 Description

Down-to-Zero forward Firm Allocations represent the Share of Total Flowgate Capacity (STFC) that an entity has been allocated on a particular Flowgate. This STFC represents the maximum total impact each entity is allowed to have on that Flowgate for the purpose of selling Transmission Service. In order to coordinate with the existing Available Flowgate Capability (AFC) process, it is necessary that this number be converted to an Available STFC (ASTFC), which represents how much Flowgate capability remains on that Flowgate for use in approving new Firm Transmission Service. After the ASTFC borrowing process (as described in section 7.11) occurs, the final ASTFC value is used in conjunction with the AFC value simultaneously to limit the sale of firm Transmission Service.

7.13.2 Current Practice

The STFC for any given entity on any given Flowgate is equal to the Forward Firm 2DA Allocation. Understanding that entities must serve their load, the net GTL impacts are subtracted from this forward value for each Flowgate. From this, entities subtract some portion of the forward impacts of the Firm TSRs that have been sold, and some portion of the reverse impacts of the Firm TSRs that have been sold. These portions vary amongst entities. This describes the amount of forward capacity each entity is permitted to use when selling Firm TSRs in a conservative approach, with the thought that counter-flow should not always be counted on to flow in real-time. This provides a safeguard against overselling transmission service which could possibly cause congestion in real-time.

7.13.3 Proposed Solution

Status Quo.

7.14 Firm Flow Entitlement (FFE)

7.14.1 Description

Market Based Operating Entities use FFEs to establish equitable firm rights which are used in the determination of congestion payments for M2M coordination. The formulation of the FFE builds upon the coordination processes outlined in the CMP. M2M congestion payments recognize overuse or underuse (dispatch credit) during congested periods. FFEs do not impact real-time dispatch, but are used instead in M2M settlements to ensure appropriate compensation based on comparison of actual Market Flow to the FFE. Principally, an FFE should be the sum of any GTL impacts plus any unused Firm Transmission Service. Additionally, limits used in Day Ahead Markets, ARR Allocation, and FTR/TCR auction coordination may reflect the FFE for each RTO.

7.14.2 Current Practice

Currently, the forward and reverse FFE components are calculated in a similar manner as forward and reverse FFLs. However, when calculating FFEs, all included impacts and allocations are Down-to-Zero.

7.14.2.1 Forward FFE

if (Forward 2DA Allocation – Forward DA GTL – Forward Schedule Impact) > 0
Forward FFE = Forward DA GTL + (Unused Firm Transmission Service)
Forward FFE = Forward DA GTL + (Forward 2DA Allocation – Forward DA GTL - Forward Schedule Impact)
Forward FFE = Forward 2DA Allocation - Forward Schedule Impact

if (Forward 2DA Allocation – Forward DA GTL – Forward Schedule Impact) < 0
Forward FFE = minimum (Forward DA Gen-To-Load, Forward 2DA Allocation)

7.14.2.2 Reverse FFE

Reverse FFE = minimum (2DA Reverse Allocation, DA Reverse GTL)

7.14.2.3 Net FFE

The Net FFE is then calculated as:

Net FFE = Forward FFE – Reverse FFE

Only the Net FFE is used in M2M settlements. The Net FFE may be positive, negative, or zero. Explicit settlement rules exist for a negative Net FFE.

7.14.3 Proposed Solution:

One of the biggest problems in netting directional FFEs to calculate a net FFE is that these directional limits use directional Allocations, which ensure that the entire Flowgate capacity is allocated in both directions. This has resulted in many FFEs incorrectly skewing closer to zero. While the FFE equation

will essentially stay the same, the net allocations that are used will reflect net impacts, allocated as described in section 7.8.3. Thus, the new FFE calculation is:

If (*Net* 2DA Allocation – *Net* DA GTL – *Net* Schedule Impact) > 0
= *Net* DA GTL + (Unused Firm Transmission Service)
= *Net* DA GTL + (*Net* 2DA Allocation – *Net* DA GTL - *Net* Schedule Impact)
= *Net* 2DA Allocation – *Net* Schedule Impact

If (*Net* 2DA Allocation – *Net* DA GTL – *Net* Schedule Impact) < 0
= minimum (*Net* DA Gen-To-Load, *Net* 2DA Allocation)

7.15 Market Flow Calculation

7.15.1 Description

The Market Flow calculation relies on calculating the Generation Shift Factors (GSF) of a market area's assigned generation and the Load Shift Factors (LSF) of its load on a specific Flowgate, relative to a system swing bus. The GSFs and LSFs are calculated in real-time from a single bus location in each Market Based Operating Entity's EMS (e.g. the terminal bus of each generator or load). The GLDF is determined through superposition by subtracting the LSF from the GSF.

Generally, the determination of the Market Flow contribution of a unit to a specific Flowgate is the product of the generator's GLDF multiplied by the actual output (in megawatts) of that generator. The total Market Flow on a specific Flowgate is calculated in each direction; forward Market Flow is the sum of the positive Market Flow contributions of each generator within the market area, while reverse Market Flow is the sum of the negative Market Flow contributions of each generator within the market area.
For purposes of the Market Flow determination, the market area is typically defined to be one of the following: (1) the entire RTO footprint; (2) a subset of the RTO region, such as a pre-integration NERC-recognized Balancing Authority Area, as necessary to ensure accurate determinations and consistency with pre-integration flow determinations.

7.15.1.1 Accounting For Interchange Transactions

A Market-Based Operating Entity must choose between one of the three following methodologies to account for Interchange Transactions in the Market Flow reported to the IDC and used in M2M Coordination. Each of these methods are not applicable to Interchange Transactions associated with jointly owned units participating in more than one market (each of which report Market Flow to the IDC). The Market Based Operating Entities Control Zone's used in the POR-POD Method or Marginal Zone Method can consist of (i) the Market-Based Operating Entity's entire Balancing Authority Area, (ii) pre-integration NERC-recognized Balancing Authority Area(s), or (iii) sub-regions within its Balancing Authority Area. For the Slice of System method, the entire Market Based Operating Entities Balancing Authority Area is used when adjusting load and generation.

7.15.1.1.1 Point-of-receipt (POR) / Point-of-Delivery (POD) Method (POR-POD Method)

Exporting Interchange Transactions, are accounted for based on the POR of the TSR, as the transmission service was originally sold, that is listed on the export tagged transaction by proportionally decreasing the MW output of all units within the Balancing Authority Area. Importing Interchange Transactions are accounted for based on the POD of the TSR, as the transmission service was originally sold, that is listed on the exporting Interchange Transaction by proportionally decreasing the MW load of all load buses in the Balancing Authority Area.

7.15.1.1.2 Marginal Zone Method

Exporting Interchange Transactions are accounted for by decreasing the MW output of the units in the Market-Based Operating Entity's Balancing Authority Area by the total MW amount of all the Market-Based Operating Entity's exporting Interchange Transactions using Marginal Zone Participation Factors and the anticipated availability of a generator to participate in the interchange of the marginal zone. Importing Interchange Transactions are accounted for by decreasing the MW load of the load buses in the Market-Based Operating Entity's Balancing Authority Area by the total MW amount of all the Market-Based Operating Entity's importing Interchange Transactions using Marginal Zone Participation Factors.

7.15.1.1.3 Slice of System Method

Exporting Interchange Transactions are accounted for by proportionately decreasing the MW output of each of the units in the Market-Based Operating Entity's Balancing Authority Area by the total MW amount of all the Market-Based Operating Entity's exporting Interchange Transactions. Importing Interchange Transactions are accounted for by proportionately decreasing the MW load of each of the load buses in the Market-Based Operating Entity's Balancing Authority Area by the total MW amount of all the Market-Based Operating Entity's importing Interchange Transactions.

7.15.2 Current Practice:

7.15.2.1 PJM/MISO:

Market Flow calculations employed today by MISO and PJM capture the GTL impacts (excludes tags) of market generation serving its network load. There are two main components of Market Flow: Native Market Flow and Transfer Market Flow. Native Market Flow describes the GTL impact on a Flowgate from an Control Zone's generation serving that same Control Zone's load. Transfer Market Flow describes the GTL impact on a Flowgate from generation in one Control Zone serving load in another Control Zone within the same BA. Both MISO and PJM employ the Marginal Zone method when accounting for Interchange Transactions. The following steps describe, at a high level, how MISO and PJM calculate Market Flow on each Flowgate.

First, MISO and PJM calculate Native Market Flow on each Flowgate.

1. Calculate the total BAA importing Interchange Transactions and exporting Interchange Transactions
2. For Each Control Zone:
    a. Assign a portion of the BAA importing Interchange Transactions using Marginal Zone Method.
    b. Assign a portion of the BAA exporting Interchange Transactions using Marginal Zone Method.
    c. Scale down generation by the portion assigned in (a)
    d. Scale down load by the portion assigned in (b)
    e. Calculate the amount of native load served (minimum of remaining Control Zone load and Control Zone generation)
    f. Calculate the Weighted Load Shift Factor (WLSF_CZ)

g. For Each Generator
    i. Designate the amount of generator MW that is serving native load
    ii. Calculate a GLDF_Native (GSF – WLSF_ CZ)
    iii. Calculate Native Market Flow contribution as the product of (g,i) and (g,ii)

Next, separate the Native Market Flow into Down-to-Zero, Threshold, forward, and reverse components:

3. Calculate the total forward Down-to-Zero Native Market Flow of the Market Based Operating Entity by summing (g,iii) for all generators where the GLDF_Native > 0%.
4. Calculate the total reverse Down-to-Zero Native Market Flow of the Market Based Operating Entity by summing (g,iii) for all generators where the GLDF_Native < 0%.
5. Calculate the total forward Threshold Native Market Flow of the Market Based Operating Entity by summing (g,iii) for all generators where the GLDF_Native >= 5%.
6. Calculate the total reverse Threshold Native Market Flow of the Market Based Operating Entity by summing (g,iii) for all generators where the GLDF_Native <= - 5%.

Next, calculate the Transfer Market Flow on each Flowgate.

7. Calculate a WLSF for unserved BAA load (WLSF_BAA)
8. For each Control Zone with remaining generation
    a. Designate total Control Zone generation MW that is serving the unserved BAA load
    b. Calculate a Weighted Generation Shift Factor (WGSF_ CZ)
    c. Calculate Control Zone generation to unserved BAA load shift factor: GLDF_Transfer = WGSF_ CZ -WLSF_BAA
    d. Calculate transfer Market Flow contribution as a product of (7a) and (7c)
9. For each Control Zone with remaining generation
    a. Designate total Control Zone generation MW that is serving the unserved BAA load
    b. For each generator
        i. Designate the amount of generator MW that is serving the unserved BAA load
        ii. Calculate generation to unserved BAA load shift factor: GLDF_Transfer = GSF-WLSF_BAA
        iii. Calculate transfer Market Flow contribution as a product of (b,i and (b,ii)

Next, separate the Transfer Market Flow into Threshold, Down-to-Zero, forward, and reverse components:

10. Calculate the total forward Down-to-Zero Transfer Market Flow of the Market Based Operating Entity by summing (7d) for all Control Zones where the GLDF_Transfer > 0%.
11. Calculate the total reverse Down-to-Zero Transfer Market Flow of the Market Based Operating Entity by summing (7d) for all Control Zones where the GLDF_Transfer < 0%.
12. Calculate the total forward Threshold Transfer Market Flow of the Market Based Operating Entity by summing (7d) for all Control Zones where the GLDF_Transfer >= 5%.
13. Calculate the total reverse Threshold Transfer Market Flow of the Market Based Operating Entity by summing (7d) for all Control Zones where the GLDF_Transfer <= 5%.

Next, calculate total Down-to-Zero, Threshold, forward, and reverse Market Flows

14. Calculate the total forward Down-to-Zero Market Flow of the Market Based Operating Entity by adding the Native (2) and Transfer (8) Market Flows
15. Calculate the total reverse Down-to-Zero Market Flow of the Market Based Operating Entity by adding the Native (3) and Transfer (9) Market Flows
16. Calculate the total forward Threshold Market Flow of the Market Based Operating Entity by adding the Native (4) and Transfer (10) Market Flows
17. Calculate the total reverse Threshold Market Flow of the Market Based Operating Entity by adding the Native (5) and Transfer (11) Market Flows

Finally, calculate total net Down-to-Zero and Threshold Market Flows

18. Calculate the total net Down-to-Zero Market Flow of the Market Based Operating Entity by adding the reverse (negative) Down-to-Zero Market Flow (13) to the forward Down-to-Zero Market Flow (12).
19. Calculate the total net Threshold Market Flow of the Market Based Operating Entity by adding the reverse (negative) Threshold Market Flow (15) to the forward Threshold Market Flow (14).

7.15.2.2 SPP:

Market Flow calculations employed today by SPP capture the GTL impacts (no tags) of SPP generation serving its network load. There are two main components of Market Flow. Native Market Flow describes the GTL impact on a Flowgate from Control Zone generation serving that same Control Zone's load. Transfer Market Flow describes the GTL impact on a Flowgate from generation in one Control Zone serving load in another Control Zone. SWPP employs the Point-of-Receipt/Point-of-Delivery (POR/POD) method when accounting for Interchange Transactions. The following steps describe, at a high level, how SWPP calculates Market Flow on each Flowgate.

First, we calculate Native Market Flow on each Flowgate.

1. For Each Control Zone:
    a. Sum all Inter Control Zone importing Interchange Transactions using POR/POD method.
    b. Sum all inter Control Zone exporting Interchange Transactions using POR/POD method.
    c. Scale down Control Zone generation by assigned in (a)
    d. Scale down Control Zone load by assigned in (b)
    e. The remaining Control Zone generation is either serving its Native Load or market transfer
    f. Calculate the Weighted Load Shift Factor (WLSF_CZ)
    g. For Each generator
        i. Designate the amount of generator MW that is serving Native Load
        ii. Calculate a GLDF_Native (GSF – WLSF_CZ)
        iii. Calculate Native Market Flow contribution as the product of (g,i) and (g,ii)

We separate the Native Market Flow into Threshold, Down-to-Zero, forward, and reverse components:

2. Calculate the total forward Down-to-Zero Native Market Flow of the Market Based Operating Entity by summing (g,iii) for all generators where the GLDF_Native > 0%.
3. Calculate the total reverse Down-to-Zero Native Market Flow of the Market Based Operating Entity by summing (g,iii) for all generators where the GLDF_Native < 0%.
4. Calculate the total forward Threshold Native Market Flow of the Market Based Operating Entity by summing (g,iii) for all generators where the GLDF_Native >= 5%.
5. Calculate the total reverse Threshold Native Market Flow of the Market Based Operating Entity by summing (g,iii) for all generators where the GLDF_Native <= -5%.

Next, calculate the Transfer Market Flow on each Flowgate.

6. Calculate a WLSF for the BAA load that remains unserved (WLSF_BAA)
7. Calculate a WGSF for the BAA generation that able to serve short loads (WGSF_BAA)
8. For each Control Zone
    a. Designate total Control Zone generation MW that is serving the BAA short load
    b. Calculate a Weighted Generation Shift Factor (WGSF_CZ)
    c. Calculate a Weighted Load Shift Factor (WLSF_CZ)
    d. Calculate Control Zone import GLDF_Transfer (WGSF_BAA – WLSF_CZ)
    e. Calculate Control Zone export GLDF_Transfer (WGSF_CZ – WLSF_BAA)
    f. Calculate import Transfer Market Flow contribution as a product of (8a) and(8d)
    g. Calculate export Transfer Market Flow contribution as a product of (8a) and(8e)

Next, separate the Transfer Market Flow into Threshold, Down-To-Zero, forward, and reverse components:

9. Calculate the total forward Down-To-Zero Transfer Market Flow of the Market Based Operating Entity by summing (8f) and (8g) for all Control Zones where the GLDF_Transfer > 0%.
10. Calculate the total reverse Down-To-Zero Transfer Market Flow of the Market Based Operating Entity by summing (8f) and (8g) for all Control Zones where the GLDF_Transfer < 0%.
11. Calculate the total forward Threshold Transfer Market Flow of the Market Based Operating Entity by summing (8f) and (8g) for all Control Zones where the GLDF_Transfer >= 5%.
12. Calculate the total reverse Threshold Transfer Market Flow of the Market Based Operating Entity by summing (8f) and (8g) for all Control Zones where the GLDF_Transfer <= -5%.

Next, calculate total Threshold, Down-To-Zero, forward, and reverse Market Flows

13. Calculate the total forward Down-To-Zero Market Flow of the Market Based Operating Entity by adding the Native (2) and half of the Transfer (9) Market Flows

14. Calculate the total reverse Down-To-Zero Market Flow of the Market Based Operating Entity by adding the Native (3) and half of the Transfer (10) Market Flows
15. Calculate the total forward Threshold Market Flow of the Market Based Operating Entity by adding the Native (4) and half of the Transfer (11) Market Flows
16. Calculate the total reverse Threshold Market Flow of the Market Based Operating Entity by adding the Native (5) and half of the Transfer (12) Market Flows

Finally, calculate total net Threshold and Down-To-Zero Market Flows

17. Calculate the total net Down-To-Zero Market Flow of the Market Based Operating Entity by subtracting the reverse Down-To-Zero Market Flow (14) from the forward Down-To-Zero Market Flow (13).
18. Calculate the total net Threshold Market Flow of the Market Based Operating Entity by subtracting the reverse Threshold Market Flow (16) from the forward Threshold Market Flow (15).

7.15.2.3 Determining Firm and Non-Firm Market Flows

While Market Based Operating Entities can use either M2M and TLR to manage inter-regional congestion, Non-Market Based Operating Entities only use TLR. In real-time, for the TLR congestion management process, the Market-Based Operating Entity is responsible for reporting Firm and Non-Firm Market Flows for Coordinated Flowgates to IDC. Directional Threshold Market Flows are currently submitted to the IDC and used to quantify NNL relief obligations assigned to the Market Based Operating Entity under a TLR. While they are also submitted to the IDC, directional Non-Threshold Market Flows are not used in TLR curtailments.

Directional Market flow up to the directional Firm Flow Limit is considered Firm Flow, or assigned as the priority of 7. Market Flow in excess of the Firm Flow Limit will be considered Non-Firm Market Flow. The Non-Firm Market flow is further divided into priority 2 (ED2) and priority 6 (ED6). During TLR, the IDC calculates the requested relief based on Threshold Market Flows. During a TLR5, the requested relief is based on Firm and Non-Firm Threshold Market Flows and Interchange Transactions. During a TLR 3, the requested relief is based only on Non-Firm Threshold Market flows and Interchange Transactions.

Market Based Operating Entities compare their Market Flows to their FFL and ED6 Non-Firm Limit calculated in section 7.12.3 to quantify Firm and Non-Firm Market Flows:

- If the Market Flow exceeds the sum of the Firm Flow Limit and the ED6 Non-Firm Limit, then:
    - 2-NH Market Flow = Total Market flow – (Firm Flow Limit + ED6 Non-Firm Limit)
    - 6-NN Market Flow = ED6 Non-Firm Limit
    - 7-FN Market Flow = Firm Flow Limit
- If the Market Flow exceeds the Firm Flow Limit, but is less than the ED6 Non-Firm Limit, then:

- 2-NH Market Flow = 0
- 6-NN Market Flow = Total Market Flow – Firm Flow Limit
- 7-FN Market Flow = Firm Flow Limit

- If the Market Flow does not exceed the Firm Flow Limit, then:
  - 2-NH Market Flow = 0
  - 6-NN Market Flow = 0
  - 7-FN Market Flow = Total Market Flow

7.15.3 Proposed Solution

Changes to Market Flow are specific to the curtailment mechanism to which they are being applied.

7.15.3.1 Market Flows used in TLR

Until the adoption of the NAESB v3.3 WEQ-008 standards, Market Based Operating Entities will continue to calculate and submit Firm and Non-Firm Market Flows for TLR as they have done prior to this proposal. In the future, the adoption of the new standards will mean that Parallel Flow Visualization functionality will exist in the IDC, and real-time GTL flows will exist for all entities, market based or otherwise. These GTL flows are calculated using a similar method to how markets currently calculate Market Flows. At that time, Market Flow calculated by Market Based Operating Entities will no longer be submitted to the IDC. The IDC will use the FFL and ED6 Non-Firm limit (section 7.12.3) to quantify Firm and Non-Firm GTL flows for each entity on each Flowgate.

7.15.3.2 Market Flows used in Market-to-Market

In an effort to align Market Flow with the solution for FFE (section 7.14.3), the Market Based Operating Entities agree to make the following changes to their Market Flow calculations for the Market Flow values that will be used in Market-to-Market redispatch and settlements.
It is important to note that if this Freeze Date solution is implemented before the implementation of PFV, this Market Flow calculation will be an additional calculation that Market Based Operating Entities will perform in conjunction with the Market Flow calculation used in Market Flows submitted to the IDC for TLR.

7.15.3.2.1 MISO

MISO honors the Regional Transfer limits in real-time dispatch. To align with real-time dispatch and FFE calculations, MISO will use a sub-regional (South/Midwest) based Market Flow calculation.

The following steps describe how MISO will calculate a **net Down-To-Zero** Market Flow on each Flowgate:

1. For each unique Interchange Transaction path (same service points in either direction)
   a. Calculate the total importing Interchange Transactions
   b. Calculate the total exporting Interchange Transactions

c. Calculate the net interchange of the path by subtracting the total imports from the total exports

2. Calculate the total BAA imports (sum of all net importing paths calculated in step 1c)
3. Calculate the total BAA exports (sum of all net exporting paths calculated in step 1c)
4. For each Control Zone:
    a. Assign a portion of the BAA imports using Marginal Zone Method
    b. Assign a portion of the BAA exports using Marginal Zone Method
    c. Scale down generation by the portion assigned in (a)
    d. Scale down load by the portion assigned in (b)
5. Determine the MISO Regional Transfer
    a. MISO Regional Transfer = South Generation- South Load + Regional Pseudo-Tie Impacts
    b. If MISO Regional Transfer > 0 (South exporting to Midwest):
        i. Scale down South generation proportionally by MISO Regional Transfer MW
        ii. Scale down Midwest load proportionally by MISO Regional Transfer MW
        iii. Calculate the MISO Regional Transfer Market Flow using GLDF (GSF-WLSF_Midwest)

    Else if MISO Regional Transfer < 0 (South importing from Midwest):
        i. Scale down Midwest generation proportionally by MISO Regional Transfer MW
        ii. Scale down South load proportionally by MISO Regional Transfer MW
        iii. Calculate the MISO Regional Transfer Market Flow using GLDF (GSF-WLSF_South)

    c. Calculate the South regional Native Market Flow using GLDF (GSF-WLSF_South)
    d. Calculate the Midwest regional Native Market Flow using GLDF (GSF-WLSF_Midwest)
    e. Calculate total Market Flow by adding the MISO Regional Transfer Market Flows and regional Native Market Flows
6. MISO will continue to calculate MOPI adjustments and Pseudo-Tie adjustments as it does today

7.15.3.2.2 PJM

The following steps describe how PJM will calculate a **net Down-To-Zero** Market Flow on each Flowgate:

1. For each unique Interchange Transaction path (same service points in either direction)
    a. Calculate the total importing Interchange Transactions
    b. Calculate the total exporting Interchange Transactions

c. Calculate the net interchange of the path by subtracting the total imports from the total exports

2. Calculate the total BAA imports as the sum of all net importing paths calculated in step 1c
3. Calculate the total BAA exports as the sum of all net exporting paths calculated in step 1c
4. For each Control Zone:
    a. Assign a portion of the total BAA imports using Marginal Zone Method.
    b. Assign a portion of the total BAA exports using Marginal Zone Method.
    c. Scale down generation by the portion assigned in (4a)
    d. Scale down load by the portion assigned in (4b)
    e. Calculate the Weighted Load Shift Factor (WLSF_BAA)
    f. For each generator
        i. Designate the amount of generator MW that is serving Network Load
        ii. Calculate a GLDF (GSF – WLSF_BAA)
        iii. Calculate the Market Flow contribution as the product of (f,i) and (f,ii)
5. Calculate the total net Down-To-Zero Market Flow as the sum of (4,f,iii) for all generators.
6. PJM will continue to calculate MOPI adjustments and Pseudo-Tie adjustments as it does today

7.15.3.2.3 SPP

SPP will continue to calculate Market Flow as it has been prior to this proposal.

7.16 Parallel Flows and Planning Processes

7.16.1 Description

Parallel flows are unavoidable, particularly as generation interconnects to the network. Ideally, parallel flows should be fully accounted for within each entity's planning process. However, due to the different planning processes and requirements between the different entities, the measured amount of parallel flows and upgrades necessary to reduce or remove these parallel flows may be different. It is important to provide appropriate incentives for entities to plan the transmission system sufficient for their own needs while appropriately recognizing the parallel flows on other systems. Ideally, entities that have funded the transmission system should have the right to use that system capability.

7.16.2 Current Practice

Depending on the entity, firm rights (FFE/FFL) for parallel flows could be granted to the entity that caused the parallel flows. This dependency exists because the different entities have different planning process, coordination efforts and interconnection requirements. Although parallel flows may be the result of interconnected operations, the firm rights for these flows on the transmission facilities of the neighboring system are granted to the entity that interconnected the generator. To support the rights of these generators, a mosaic of coordinated planning processes exist between entities (commonly referred to as affected system studies), including various forms of generator interconnection, deliverability, and transmission impact studies. These processes strive to ensure that impacted neighboring areas can be studied appropriately and trigger necessary upgrades. Firm rights are also granted explicitly through the Transmission Upgrade Studies (TUS) process to compensate entities who build new transmission. This process ensures the building entity can acquire firm rights for transmission it funds.

7.16.3 Proposed Solution

The solution to resolve parallel flow impacts starts with the planning process. Today planning processes and coordination efforts are different between each entity. A comparable treatment of planning and coordinated efforts will be needed to resolve how the parallel flows on other systems will be limited or recognized. After a review between all the coordinated entities, the following conclusion and solution is proposed.

7.16.3.1 All Entities:

While many instances of coordination may already exist, in an effort to ensure reliability is met on neighboring systems, all entities planning processes should include coordination with neighbors inclusive of notification to neighbors of potential impacts to affected systems. All Entities will periodically review their planning processes and impacts to parallel flows on neighboring systems with respect to firm rights and have ongoing discussions committed to pursue planning process changes as necessary. The entities need to ensure that their respective studies for generator interconnection and

Transmission Service (including Network Load deliverability studies) include provisions for coordinating with impacted Parties' transmission system consistent with how that party evaluates its own transmission system in those processes. For instances where BAAs are combining, a generation deliverability and load deliverability study will be conducted and neighboring systems will be monitored for impacts. Impact studies for the combining of BAAs should also include realistic generation scenarios to reflect transfers to and from the combining BAAs to capture possible neighboring system impacts due based on projected economic generation dispatch.

7.16.3.2 PJM-MISO

PJM and MISO have reviewed their planning processes and impacts to parallel flows on neighboring systems with respect to the calculation of firm rights, and have concluded that the current processes are sufficient and no changes are necessary at this time. As described in the PJM-MISO JOA, these processes include (existing or pending), coordinated generation interconnection studies, targeted market efficiency analysis, interregional market efficiency analysis, and modeling of external flow impacts in load deliverability analysis. In addition, the TUS process supplements these planning processes to ensure allocations align with the entity that builds or funds an upgrade.

7.16.3.3 MISO-SPP

MISO and SPP have reviewed their planning processes and impacts to parallel flows on neighboring systems with respect to allocations and have ongoing discussions committed to pursue planning process and cost allocation changes. MISO and SPP already have coordinated efforts for generation interconnection and market efficiency and need to ensure that their respective studies for generator interconnection and transmission service (including network load deliverability studies) include provisions for coordinating with impacted Parties' transmission system consistent with how that Party evaluates its own transmission system in those processes. MISO and SPP are committed to develop a process to address regional cost allocation voltage differences (including projects down to 100 kV). In addition, SPP and MISO intend to pursue adopting similar targeted market efficiency analysis processes that PJM and MISO have in place. MISO and SPP have committed to pursue the interregional process and cost allocation changes pending the outcome of SPP and MISO's regional and interregional stakeholder processes. These planning discussions will not hold up the Freeze Date implementation and can be held in parallel.

7.16.3.4 PJM-TVA-LG&E/KU

PJM, TVA, and LG&E/KU have reviewed their planning processes and have proposed major revisions to the coordinated regional transmission expansion planning process. These revisions include specifics of what defines significant impact on a neighboring Party's transmission system for both generator interconnection requests and long term firm Transmission Service requests. Contingency analysis and PTDF screening criteria on monitored facilities 69kV and above provides a more defined trigger for coordination between the Parties.

Further, section 8.4.4 of this proposed language specifies coordinated studies that are to be applicable to a BAA integration. This entails measuring and comparing pre-integration and post-integration flows, where the post-integration flows reflect the anticipated economic dispatch for the new BAA, post integration. Cost allocation guidelines of the required upgrades that result from these coordinated studies reflect the benefits that the integrating and impacted party receive as a result of the upgrade(s).

7.17 Out of Scope Items

Out of scope items, while not part of the Freeze Date resolution embodied in this straw proposal, are being evaluated by the CMPWG in parallel to the Freeze Date.

7.17.1 NNL Model Update Process

7.17.1.1 Description

The NNL model update chooses a monthly IDC PSSE case that will represent the base model for the NNL process for a specified period of time. This base model, along with outages applied as detailed in section 7.6, is used to calculate shift factors to determine generator and TSR/Transfer impacts.

7.17.1.2 Current Practice

Currently updated to use latest IDC case twice a year with the NNL model update.

7.17.1.3 Proposed Solution

Status quo, however, the CMP is looking to enhance the NNL model update process in the future.

7.17.2 Transmission Upgrade Studies

7.17.2.1 Description

A methodology for obtaining additional firm rights associated with transmission upgrades.

7.17.2.2 Current Practice

Transmission Upgrade Studies (TUS) and Appendix G in the CMP.

7.17.2.3 Proposed Solution

Current practice will remain in place; however, the CMP is looking to enhance the TUS process in the future.