



ARR/FTR Solution Options – Follow up

FTR Group

AFMTF

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Additional analysis completed for solution option support:

- Modified the guarantee level of cleared Stage 1A ARRAs
 - Measured impact on cleared ARRAs and feasibility for multiple percentage levels within zone and across zones.
- Impacts to alternatives to outage modeling
- Impacts to transmission capability from generator interconnections



Historical Zonal Base Load (ZBL) as a Percentage of NSPL

Key takeaway: A fixed guarantee of 60% would increase Stage 1A MW awards for all zones, and is above all historical ZBL as a percentage of NSPL.

ZONE	17/18	18/19	19/20	20/21	21/22	Average 5-year
AE	37.7%	39.8%	38.2%	36.1%	35.0%	37.4%
AEP	54.0%	57.7%	56.5%	54.1%	53.3%	55.1%
AP	53.2%	54.5%	52.6%	49.3%	51.4%	52.2%
ATSI	49.6%	52.8%	51.6%	49.4%	45.2%	49.7%
BC	45.4%	46.7%	45.2%	44.5%	43.7%	45.1%
CE	44.0%	45.1%	43.2%	42.6%	40.7%	43.1%
DAY	47.7%	48.7%	49.0%	48.2%	43.5%	47.4%
DEOK	48.8%	51.4%	51.0%	48.8%	46.7%	49.4%
DOM	47.6%	48.1%	45.7%	49.2%	48.6%	47.8%
DPL	41.5%	46.0%	44.4%	40.4%	40.9%	42.6%
DUQ	47.4%	49.2%	48.9%	47.7%	43.8%	47.4%
EKPC	39.7%	44.3%	36.4%	38.0%	42.7%	40.2%
JC	38.0%	39.8%	37.2%	35.3%	35.6%	37.2%
ME	48.3%	49.3%	50.0%	47.0%	45.7%	48.0%
OVEC	N/A	47.2%	21.1%	21.8%	17.6%	26.9%
PE	46.8%	47.8%	45.0%	44.1%	43.8%	45.5%
PEP	42.5%	46.5%	43.5%	43.6%	43.4%	43.9%
PL	45.7%	51.7%	51.7%	47.3%	50.9%	49.4%
PN	58.1%	57.4%	57.6%	55.2%	55.9%	56.8%
PS	43.1%	44.8%	42.7%	42.2%	41.6%	42.9%
RECO	35.9%	35.7%	34.4%	35.7%	33.7%	35.1%

Setup

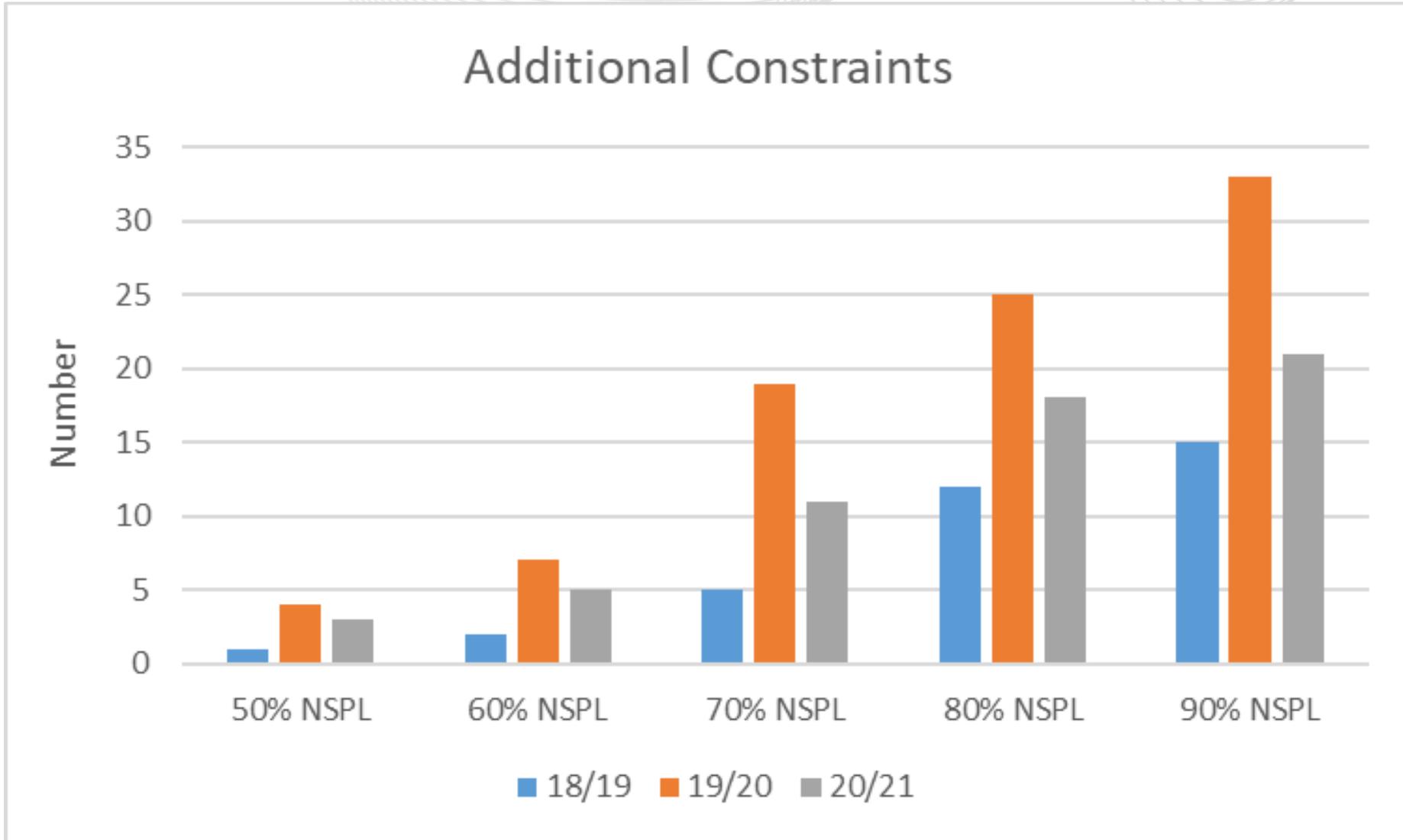
- Stage 1A No Outage Cases
- Update zonal ARR up to 50%, 60%, 70%, 80%, and 90% of NSPL

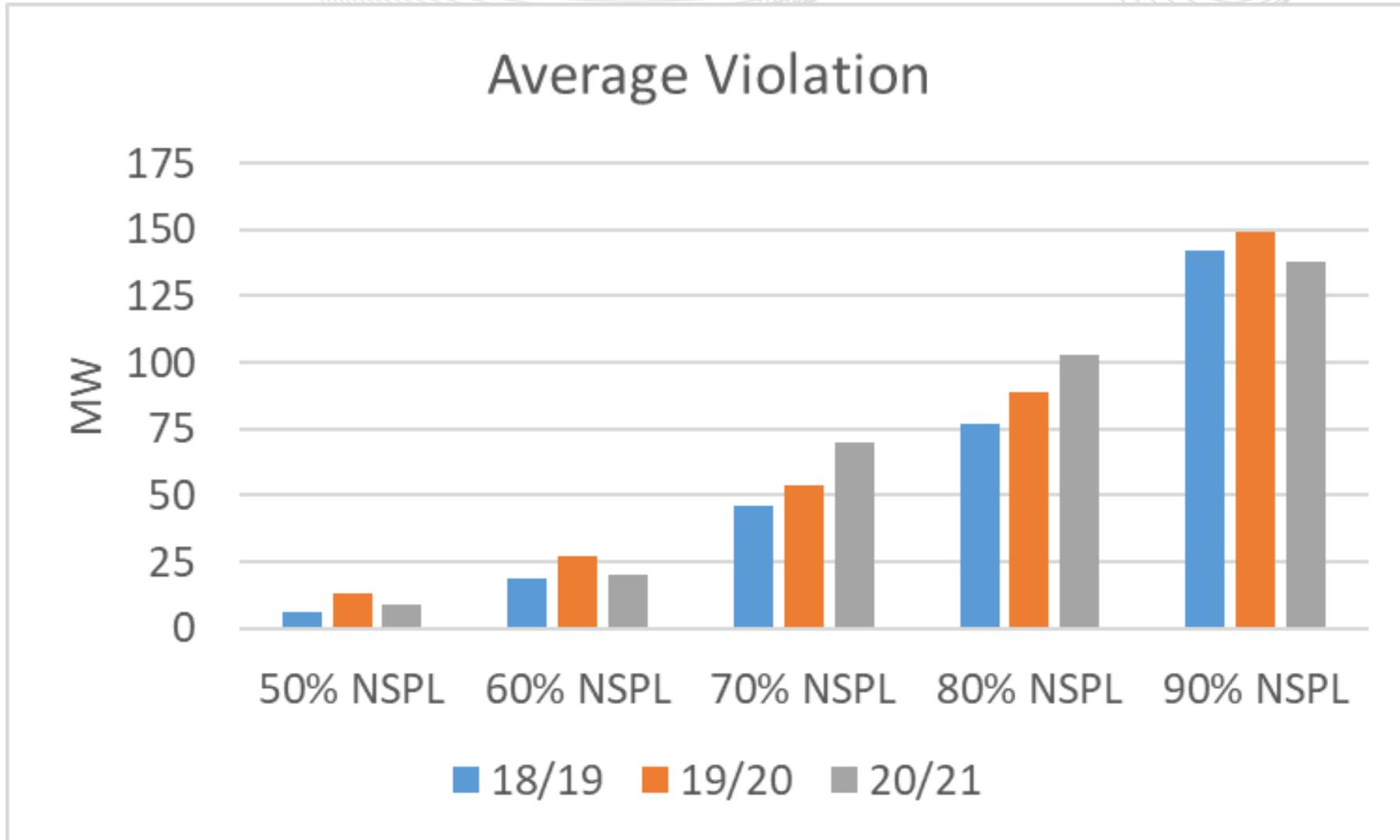
Study I

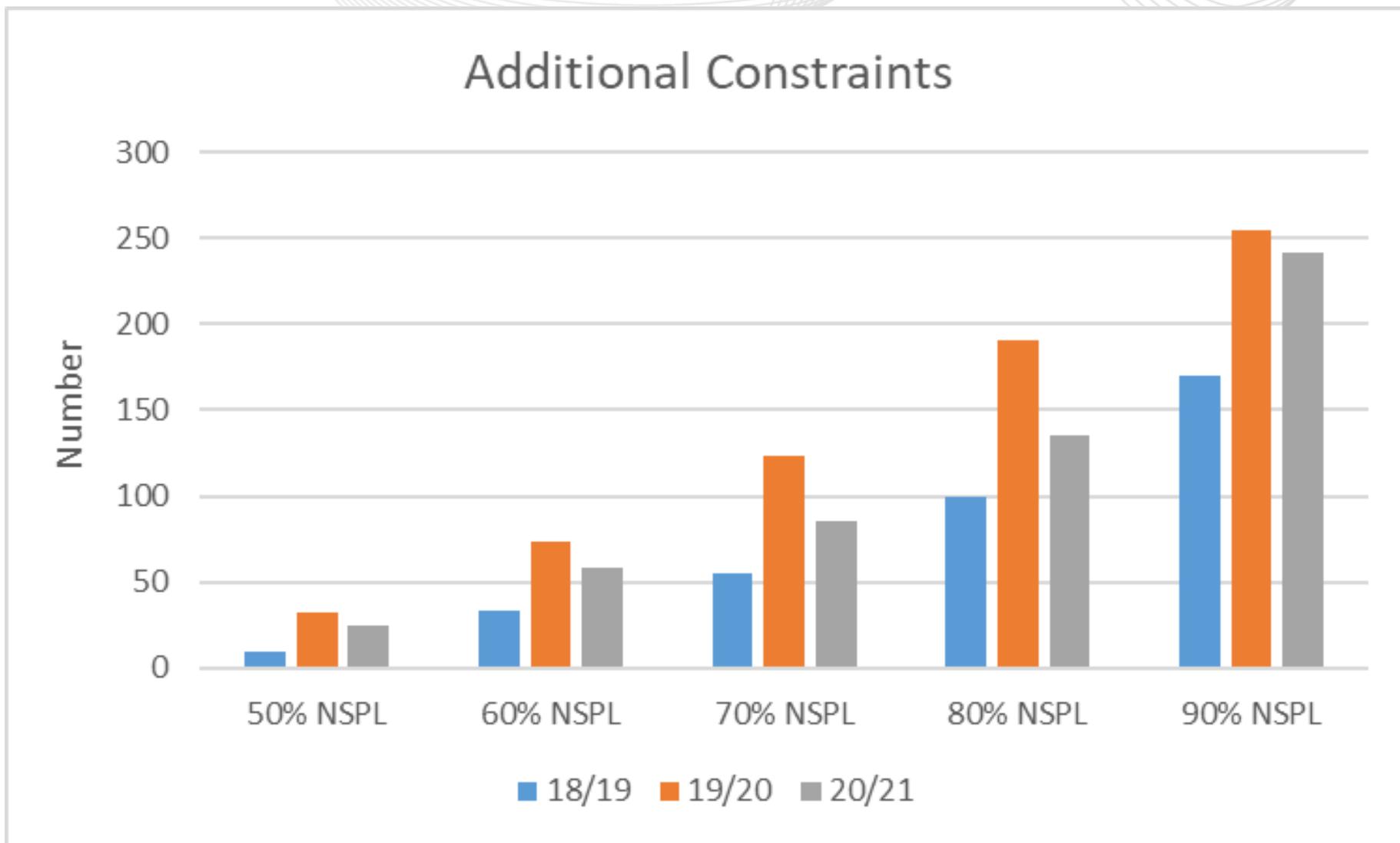
- Each generator in zone increased as % of its zonal NSPL
- Accordingly, each zonal load increased the same as generation (ARR paths sink at zone where have load)

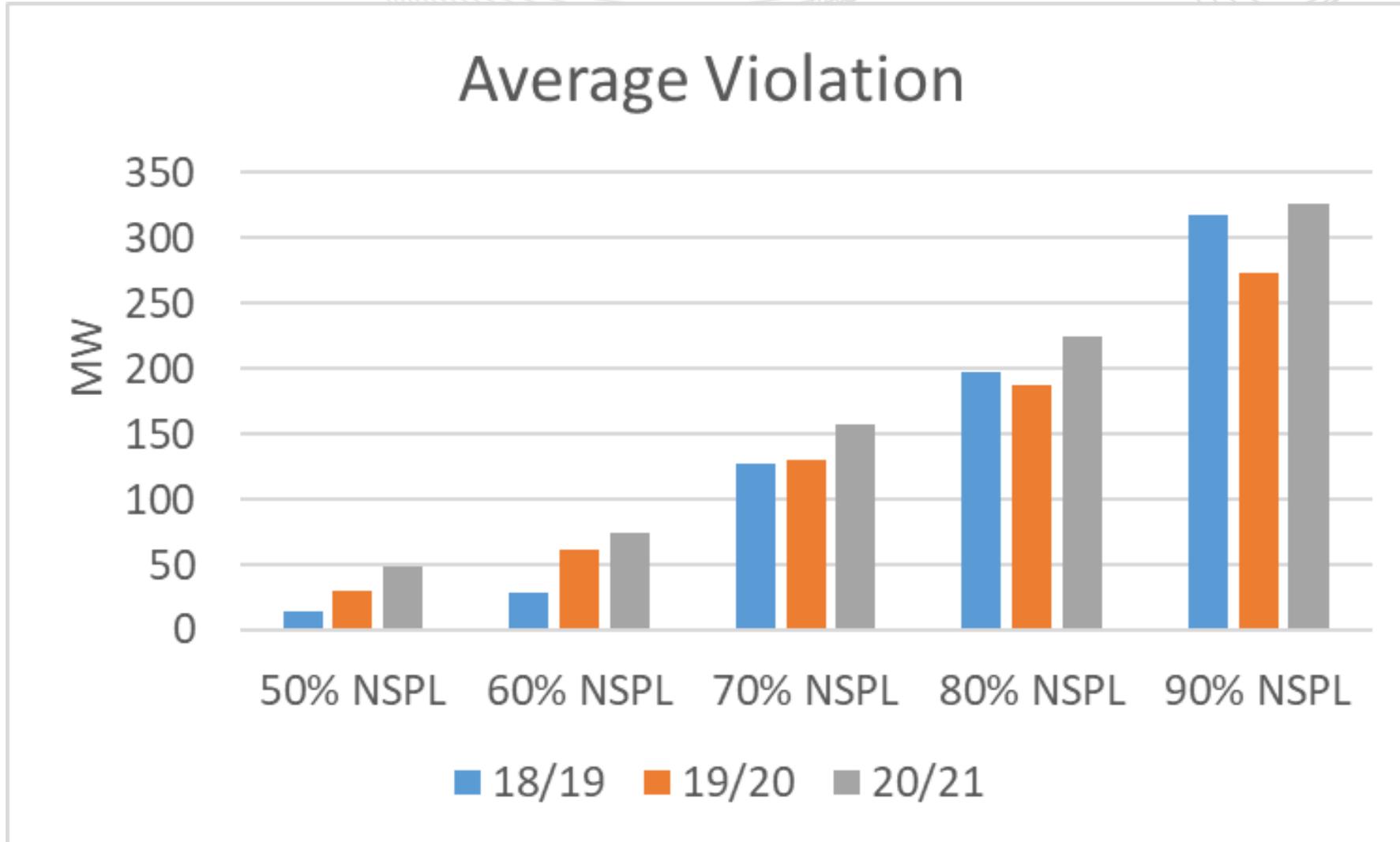
Study II

- Each generator in zone increased as % of its zonal NSPL
- Total RTO load increased same as generation (ARR paths can cross zones)

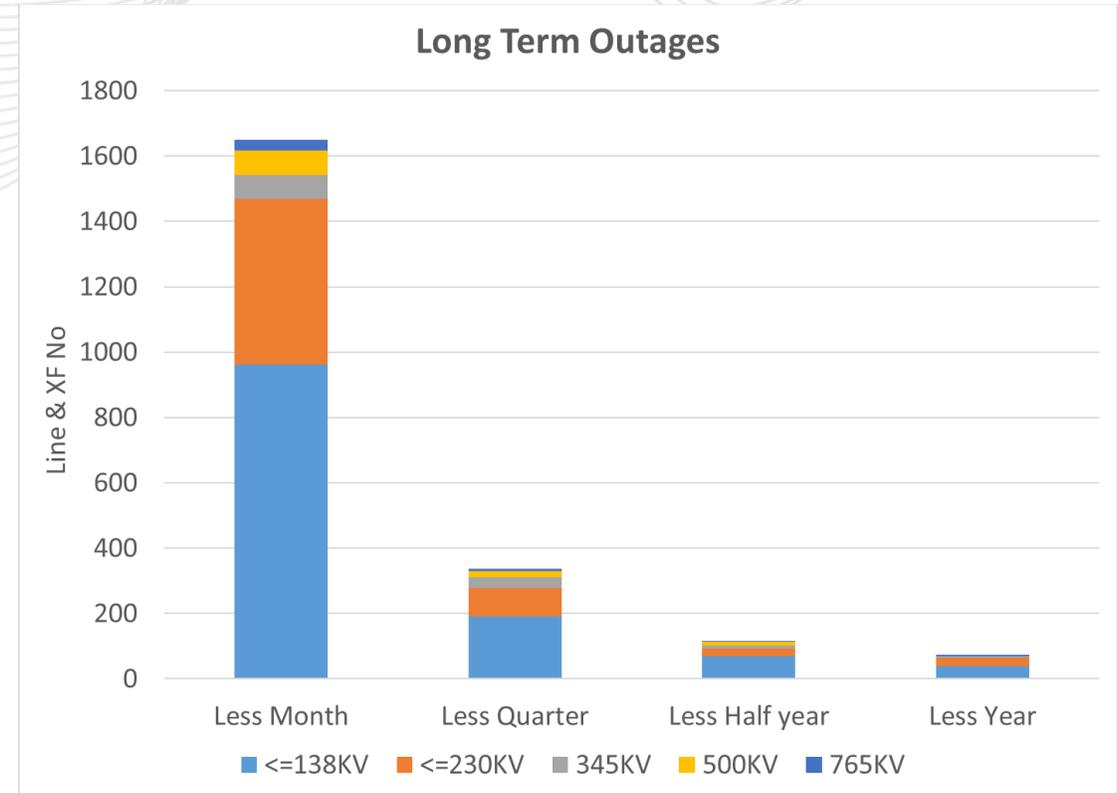
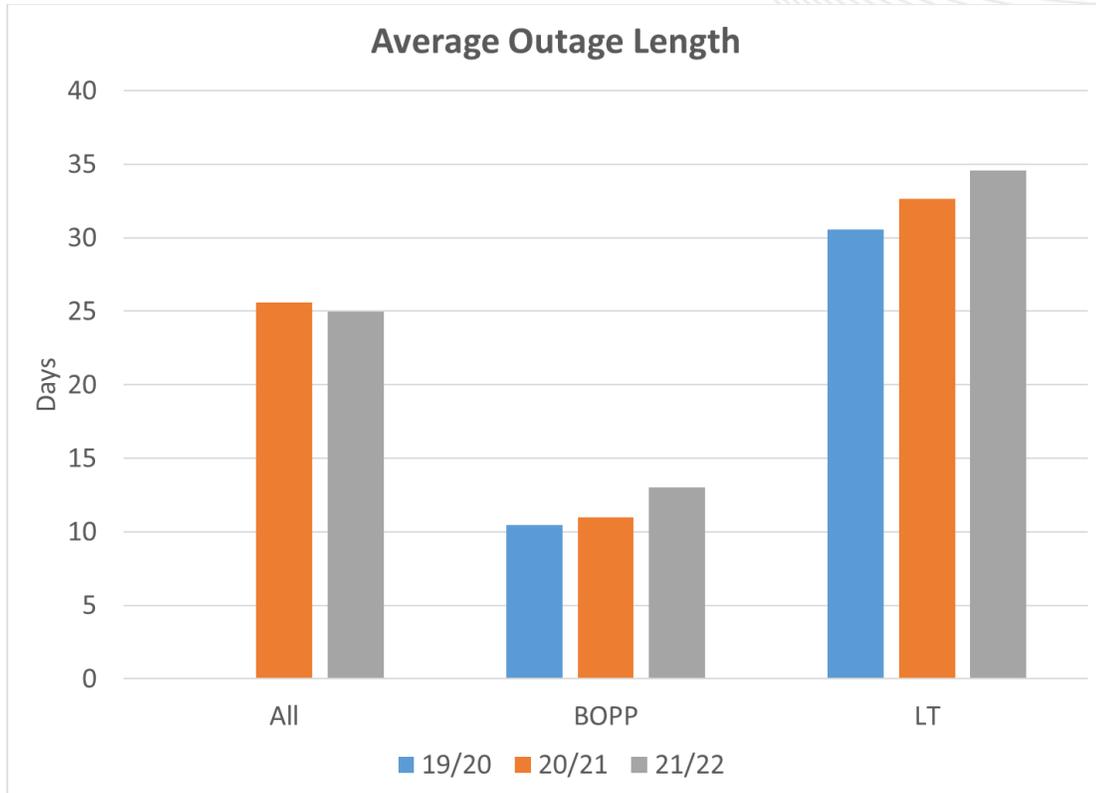


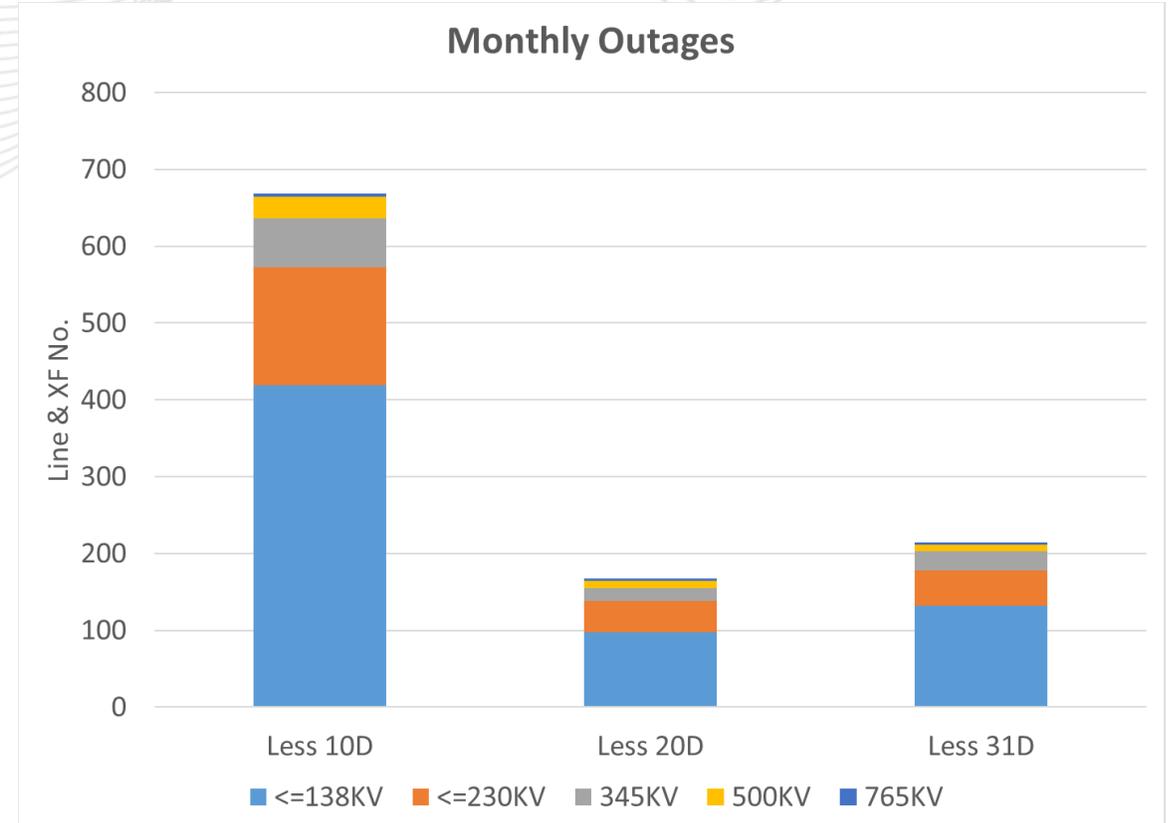
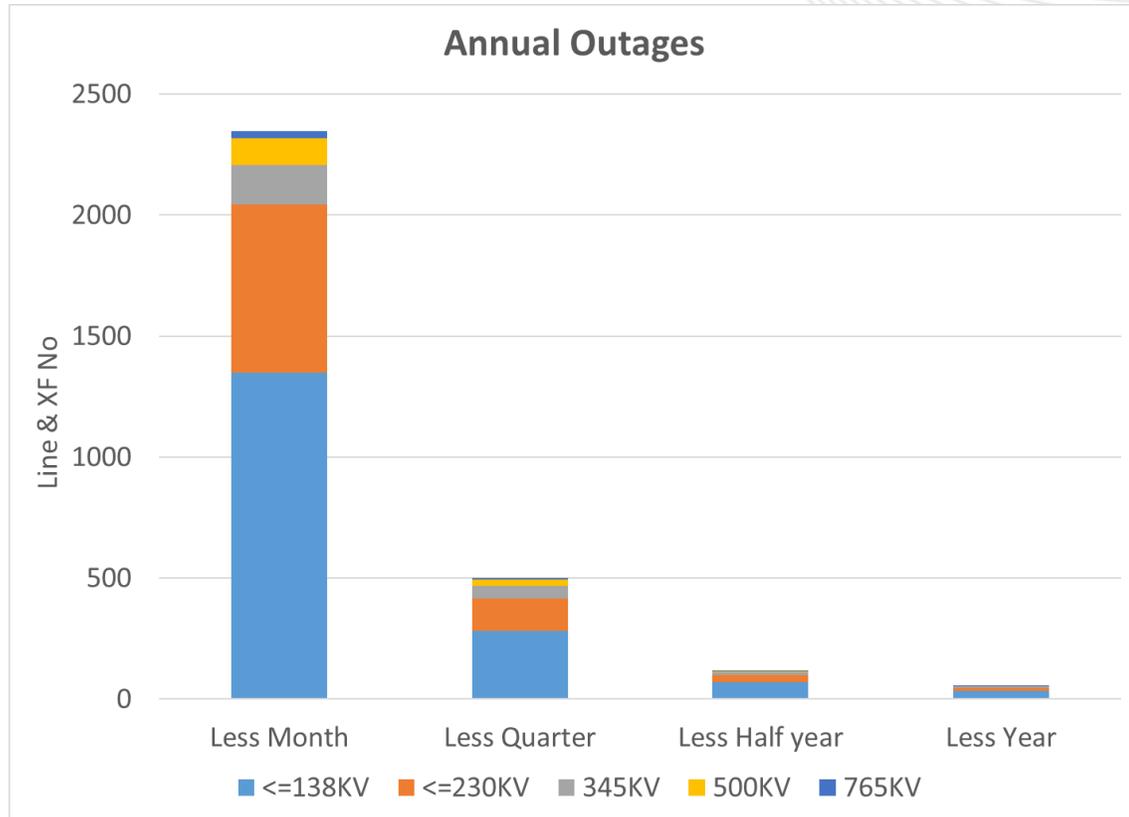


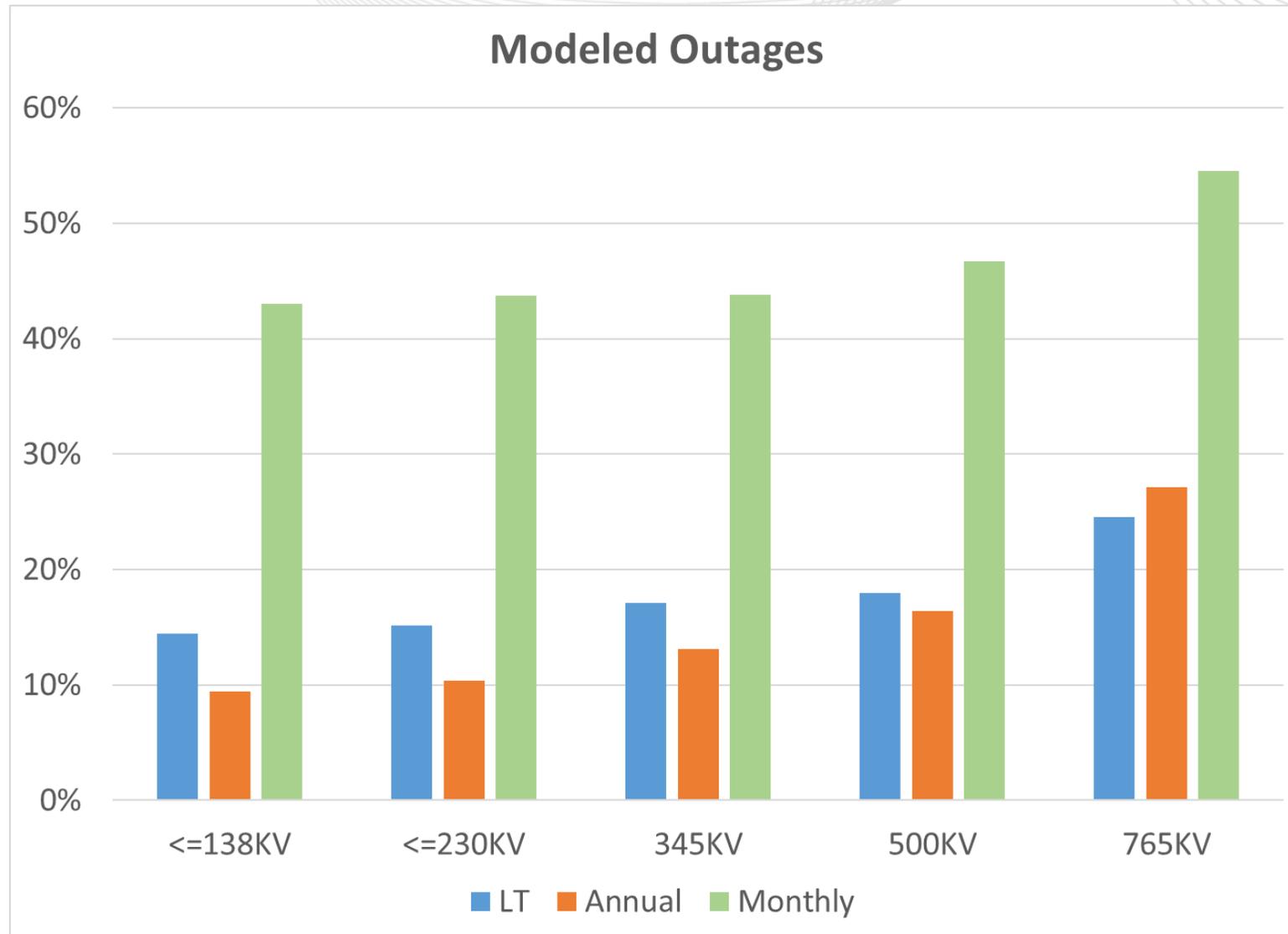




Average Length and Distribution of eDart Outages







- Simulated in a single period of a Monthly Auction
 - Existing Method: Modeled outages of ~200 facilities
 - De-rating: Length of Outages / Auction Period
 - Changed ratings of ~ 500 facilities (Line and XF) for one period of Monthly auction
- Results
 - Cleared MW increased 0.34%
 - Revenue increased 24%



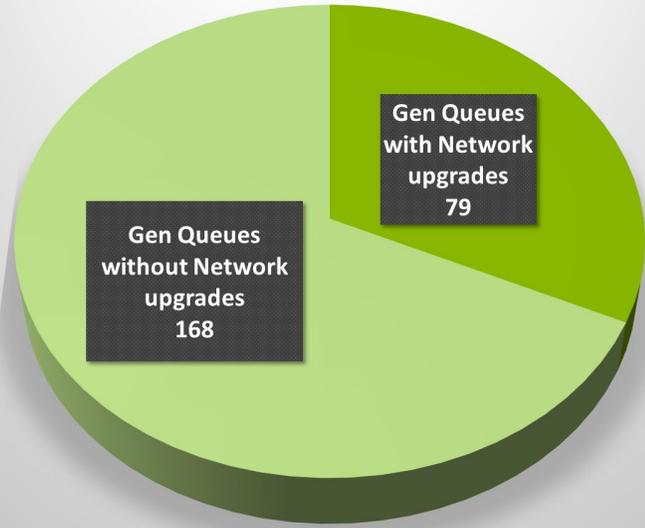
Transmission Capability from Generator Interconnections

Generation interconnections by capacity and network upgrades for past 5 years.

Resource Capacity	<50MW		50~500MW		500~1000MW		>1000MW	
NetWork Upgrades	No	Yes	No	Yes	No	Yes	No	Yes
2017	42	12	3			4		
2018	32	10	10	5	1	7		2
2019	29	13	3	4		1		1
2020	34	15	2	4				
2021	11	1	1					
Grand Total	148	51	19*	13	1*	12		3

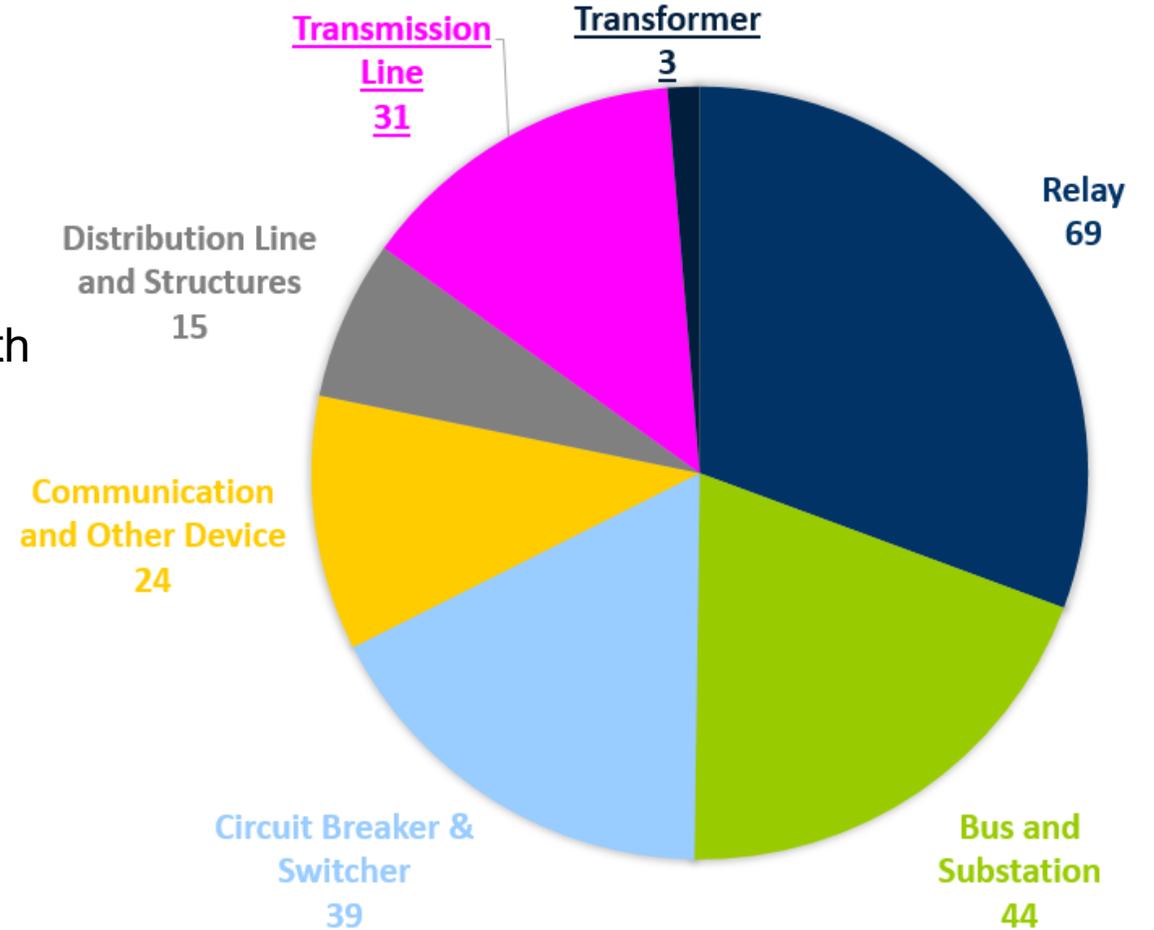
* 20 Queues with capacity above 50 MW without network upgrade, because uprates to either existing generation or a prior queued project

Total 247 Generation Queues in 5 years



225 Network Projects associated with 79 Queues

UPGRADE EQUIPMENT FOR 225 NETWORK PROJECTS



- Reduce solution options and poll support for various options
- Proposal based on collective feedback and PJM principles
- Poll proposals for MIC consideration

Facilitator:

David Anders,

David.Anders@pjm.com

Secretary:

Ankit Kharod

Ankit.Kharod@pjm.com

SME/Presenter:

FTR Group

FTRGroup@pjm.com



Member Hotline

(610) 666 – 8980

(866) 400 – 8980

custsvc@pjm.com