Odessa Disturbance 2: June 4th, 2022

IBRTF Meeting

June 10th , 2022

Odessa Disturbance 2: Event Summary

- Event initiated by lightning arrestor fault on 345 kV level in Odessa area
- Fault occurred on June 4th at 12:59:25 PM
- Preliminary estimated loss of 2,519 MW of thermal and IRR generation
  - 1,666 MW of IRR generation loss from 14 solar facilities
  - 853 MW of thermal generation loss
- System Frequency declined to 59.706 Hz and recovered to 60 Hz in 1 min 20 sec
- 1,227 MW of RRS deployed
- 1,116 MW of Load Resources deployed
- Categorized as NERC Cat 3 event (gen loss > 2000 MW)

Real Time PMU Voltage

- Lowest recorded voltage of 0.714pu from PMU in Odessa area on 345 kV line
- Highest recorded voltage of 1.102pu from PMU in Del Rio area on 138 kV line
- Oscillations in Fort Stockton area
- Attempted reclose ~10 seconds later
- Waiting on fault details from TO
- Faults cleared in ~3 cycles
- Within VRT “No Tripping” zone in NOG 2.9.1

Real Time PMU Frequency

- Most PMUs lowest freq. of 59.7 Hz after LOG
- Single PMU near Laredo had lowest freq. of 59.62 Hz
- Couple other PMUs in South dipped below 59.7 Hz
- Local transient freq. seen as low 58.83 Hz and high as 60.26 Hz in Far West
- Protection settings should not be set on transient freq.
- Need to perform ringdown analysis on system modes

Thermal Generation Loss

- Loss of 3 CC units within 2 different facilities
- 1st facility near Odessa where lightning arrestor fault occurred had 2 CC units trip/reduce output
  - First CC generating ~333 MW tripped off with line to POI
  - Second CC dropped ~210 MW immediately and ran back remaining ~287 MW over next 13 minutes
- 2nd facility near Rio Grande Valley
  - Tripped ~310 MW
  - Root Cause unknown
- RFIs being sent to both facilities

Solar Generation Loss

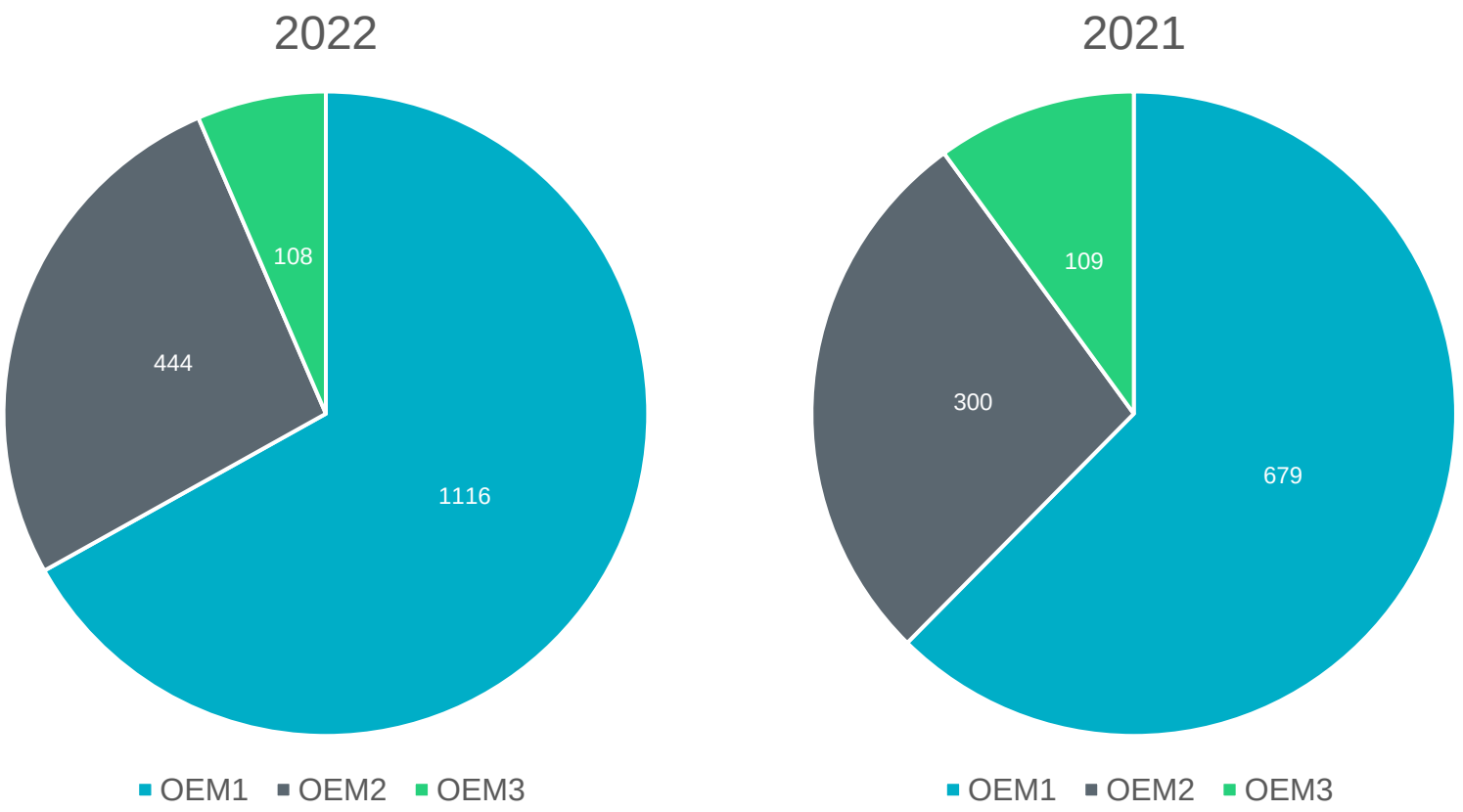
- 14 facilities consisting of 19 units lost >10 MW
  - Total estimated generation loss of 1,666 MW vs. 1,112 MW in Odessa event 2021
  - Does not include generation that came back within 2 sec or fault clearing
- 9 of the 14 lost generation in Odessa event May 2021
  - 8 identified in NERC Odessa Disturbance report (10 total facilities identified in report)
  - Remaining 5 either in commissioning, offline, or rode through

Solar Generation Loss

Facility	Inverter OEM	MW Loss 2022	MW Loss 2021	Recovery time 2022	Recovery MW 2022
Plant A	OEM3	N/A	28	N/A	N/A
Plant B	OEM1	133	150	8 min	Full
Plant C/D	OEM1	56	64	5 min	Full
Plant E*	OEM1	295	21	1 min	65%
Plant F	OEM3	47	48	6 min	90%
Plant G/H	OEM1	N/A	239	N/A	N/A
Plant I/J	OEM1	196	205	13 min	Full
Plant K/L	OEM2	119	153	2 min	Full
Plant M	OEM2	121	147	1 min	Full
Plant N/O	OEM3	50	23	30 min	Full
Plant P	OEM1	259	N/A	2 min	90%
Plant Q	OEM2	94	N/A	8 min	30%
Plant R	OEM1	176	N/A	6 min	74%
Plant S	OEM2	104	N/A	Offline till Next Day	0%
Plant T	OEM2	6	N/A	5 min	Full
Plant U	OEM3	10	9	5 min	Full

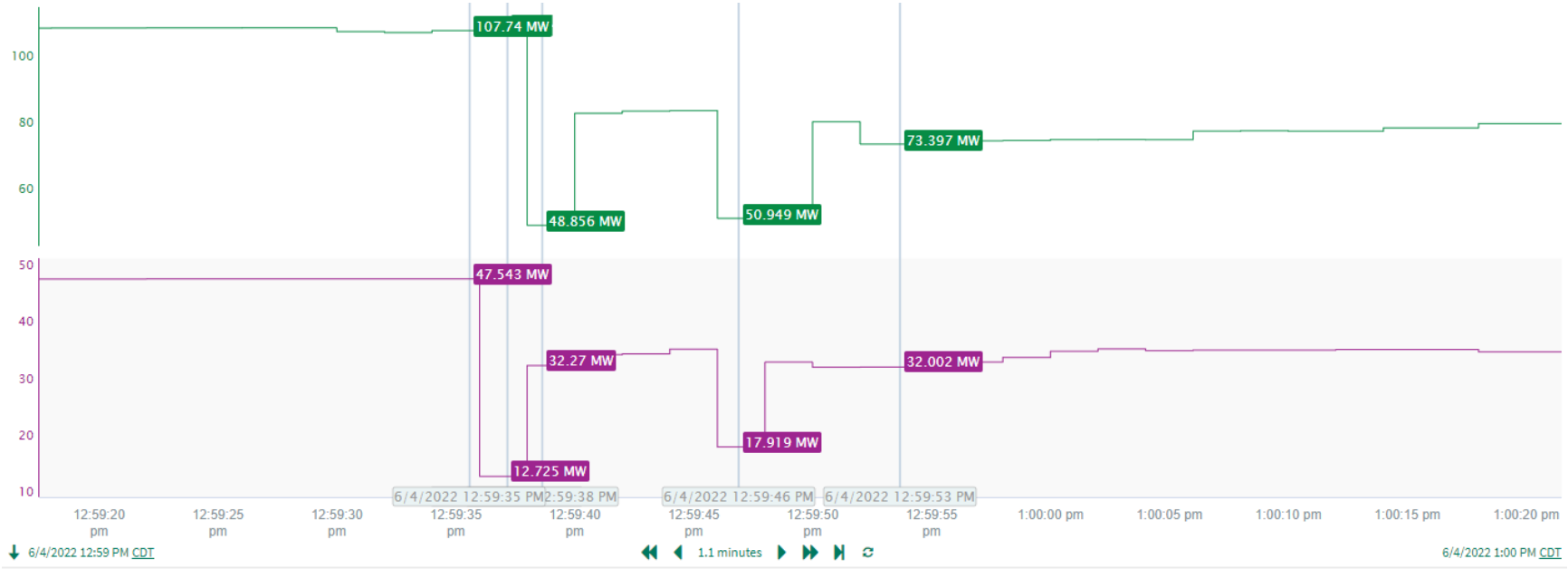
*Plant E has additional unit from 2021

MW Loss per Inverter Type



Generation Loss with Fast Recovery

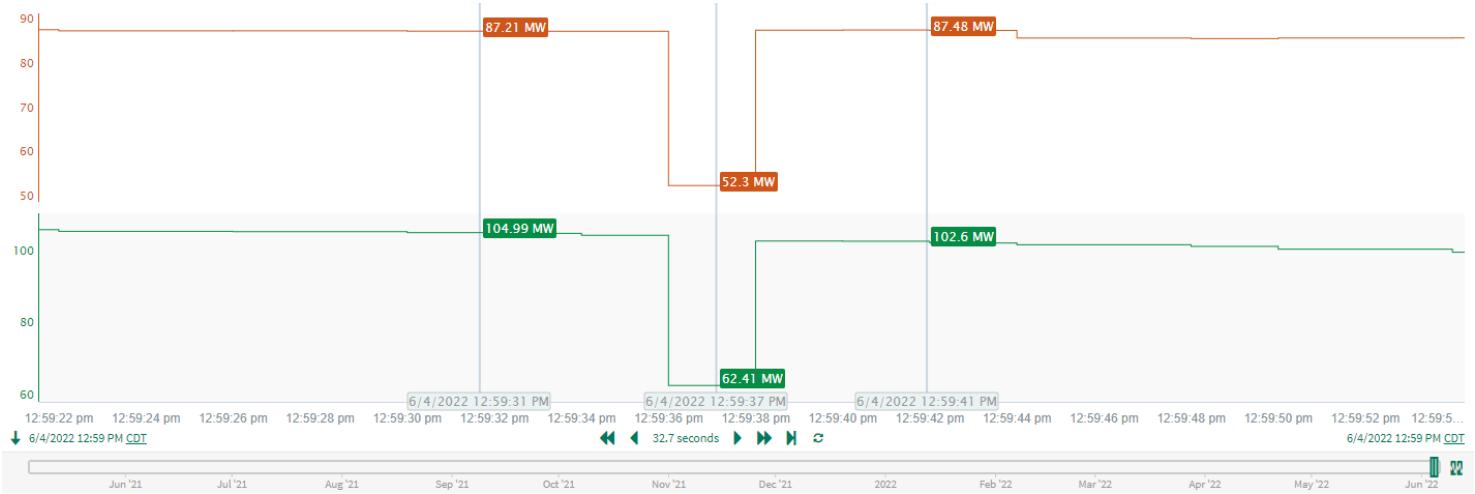
- Solar generation loss total does not include MWs recovered within 2 seconds (SCADA scan)
- SCADA not able to pick up lowest MW
- Have seen units fall to zero in high resolution data but very little loss seen in SCADA
- Possibly much greater loss than what we see in telemetry



*Plant N/O recorded as 50 MW loss

Generation Loss with Fast Recovery

- Additional 4 facilities that had significant loss seen in SCADA with fast recovery
- Likely more but unable to see with SCADA only
- Requesting PMU data for all solar farms in the area
- Will calculate loss of all units within first couple seconds
- From SCADA alone, additional ~230 MW was lost in first 2 seconds



Next Steps

- 20 RFIs going out today
  - Due 6/24 @ 5PM – No extensions
  - Reasons for inverter trips / MW reduction
  - Protection and control function settings with setpoint and timing thresholds
  - Corrective actions since Odessa 1
- PMU/DFR data requests went out Tuesday
  - Due Wednesday, June 15th
  - All solar farms should have PMU data
- NERC Brief Report

Other Events

- March Panhandle Events
  - Collaborating with NERC/TRE to review high resolution data and meet with windfarms
  - ERCOT Final Report
  - NERC Event Report
- Smaller Solar Event on May 24th
  - Fault also in Odessa area; occurred at 7:30 PM
  - ~130 MW solar generation loss across 5 facilities
  - 3 facilities also reduced MW during June 4th event
  - Majority came from one facility that rode through June 4th event
  - Likely much larger event if occurred earlier

Questions?