

**January 2016 ERCOT Monthly Operations Report**

**Reliability and Operations Subcommittee Meeting**

**March 3rd, 2016**

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# Report Highlights

* The unofficial ERCOT peak for January was 49,279 MW.
* There were four frequency events in January. PMU data indicates the ERCOT system transitioned well in each case.
* There were three instances where Responsive Reserves were deployed, all of which were the result of frequency events.
* There were six RUC commitments in January.
* The level of reportable SCED congestion decreased in January. This congestion was due primarily to planned outages and area load/gen patterns. There were twenty instances of activity distributed over 16 days on the Generic Transmission Constraints (GTCs) in January. This included one day on the Molina GTC, fifteen days on the Liston GTC, one day on the Panhandle GTC and three days of activity on the Zorillo – Ajo GTC.
* There were no significant system events for the month of January.
* ERCOT Applications performed well throughout the month. There were no ERCOT related application performance issues.

# Frequency Control

## Frequency Events

The ERCOT Interconnection experienced four frequency events in January, all of which resulted from Resource trips. The average event duration was approximately 0:06:07.

When analyzing frequency events, ERCOT evaluates PMU data according to industry standards. Events with an oscillating frequency of less than 1 Hz are considered to be inter-area, while higher frequencies indicate local events. Industry standards specify that damping ratio for inter-area oscillations should be 3.0% or greater. All events listed below indicate the ERCOT system met these standards and transitioned well after each disturbance.

Reported frequency events will include both frequency events where frequency was outside the range of 60±0.1 Hz as well as those determined to be Frequency Measurable Events (FME) as defined by BAL-001-TRE-1. Delta Frequency is defined as the difference between the pre-perturbation and post-perturbation frequency. The Duration of Event is defined as the time it takes for the frequency to recover to lesser/greater of the frequency at the time of the frequency event (*t(0)* or “A*-point*”) for low/high-frequency events, respectively. Further details on FMEs can be found in the MIS posted BAL-001-TRE-1 PDCWG Unit Performance reports. A summary of the frequency events is provided below:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Date and Time** | **Delta Frequency** | **Max/Min Frequency** | **Duration of Event** | **PMU Data** | **Load** | **Wind**  | **Inertia** | **Comments** |
| **(Hz)** | **(Hz)** | **Oscillation Mode (Hz)** | **Damping Ratio** | **(MW)** | **(GW-s)** |
| 1/8/2016 10:30 | 0.084 | 59.90 | 0:04:28 | PMU Data Not Available. | 37,089 | 3.39% | 207,525 | Unit Trip of 392 MW |
| 1/13/2016 14:22 | 0.063 | 59.92 | 0:06:49 | PMU Data Not Available. | 34,385 | 7.23% | 224,912 | Unit Trip of 408 MW |
| 1/21/2016 23:14 | 0.131 | 59.84 | 0:07:40 | 0.73 | 22% | 38,105 | 17.63% | 206,696 | Unit Trip of 823 MW |
| 1/26/2016 23:25 | 0.145 | 59.73 | 0:05:32 | 0.69 | 5% | 36,862 | 10.56% | 240,843 | Unit Trip of 1346 MW  |

(Note: frequency events highlighted in blue have been identified as FMEs per BAL-001-TRE-1 and the Performance Disturbance Compliance Working group.)



## Responsive Reserve Events

There were three events where Responsive Reserve MWs were released to SCED in January. The events highlighted in blue were related to frequency events reported in Section 2.1 above.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date and Time Released to SCED** | **Date and Time Recalled** | **Duration of Event** | **Maximum MWs Released** | **Comments** |
|
| 1/8/2016 10:30:34 | 1/8/2016 10:33:50 | 0:03:16 | 199.70 |   |
| 1/21/2016 23:14:54 | 1/21/2016 23:21:46 | 0:06:52 | 860.42 |   |
| 1/26/2016 23:25:18 | 1/26/2016 23:30:26 | 0:05:08 | 1343.50 |   |

## Load Resource Events

There were no load resource deployment events in January.

# Reliability Unit Commitment

ERCOT reports on Reliability Unit Commitments (RUC) on a monthly basis. Commitments are reported grouped by operating day and weather zone. The total number of hours committed is the sum of the hours for all the units in the specified region. Additional information on RUC commitments can be found on the MIS secure site at Grid 🡪 Generation 🡪 Reliability Unit Commitment.

There were no DRUC commitments in January.

There were six HRUC commitments in January.

|  |
| --- |
| **HRUC Commitments** |
| **Resource Location** | **# of Resources** | **Operating Day** | **Total # of Hours Committed** | **Total MWhs** | **Reason for commitment** |
| Southern | 1 | 1/11/2016 | 5 | 215 | Local Congestion |
| Southern | 1 | 1/11/2016 | 5 | 206 | Local Congestion |
| Southern | 1 | 1/12/2016 | 15 | 632 | Local Congestion |
| Southern | 1 | 1/13/2016 | 16 | 688 | Local Congestion |
| Southern | 1 | 1/27/2016 | 7 | 301 | Local Congestion |
| Southern | 1 | 1/27/2016 | 10 | 549 | Local Congestion |

# Wind Generation as a Percent of Load



# Congestion Analysis

The number of congestion events experienced by the ERCOT system decreased in January due to planned outages and area load/gen patterns. There were twenty instances of activity distributed over 16 days on the Generic Transmission Constraints (GTCs) in January.

## Notable Constraints for January

Nodal protocol section 3.20 specifies that ERCOT shall identify transmission constraints that are active or binding three or more times within a calendar month. As part of this process, ERCOT reports congestion that meets this criterion to ROS. In addition ERCOT also highlights notable constraints that have an estimated congestion rent exceeding $1,000,000 for a calendar month. These constraints are detailed in the table below. Rows highlighted in blue indicate the congestion was affected by one or more outages. For a list of all constraints activated in SCED for the month of January, please see Appendix A at the end of this report.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Contingency** | **Overload** | **# of Days Constraint Active** | **Estimated Congestion Rent** | **Transmission Project** |
| Villa Cavazos - Military Highway Aep 138 kV | Los Fresnos - Loma Alta Substation 138 kV | 6 | $6,021,297.12  | 16TPIT0030  |
| Carrolton Northwest - Lewisville Switch 345 kV | Carrollton Northwest - Lakepointe Tnp 138 kV | 9 | $1,197,520.70  | 2014 RTP |
| DCKT Gibbons Creek - Singleton 345 kV | Jewett - Singleton 345 kV | 9 | $1,065,468.33  | 4485, 3937, 3950 (a,b) |
| DCKT Lon Hill - North Edinburg 345 kV and Orange Grove Switching Station 138 kV | Javalina Tap - Molina 138 kV | 11 | $820,383.88  | 4401 |
| Bluff Creek T2 345/138 kV | Bluff Creek T1\_H 345/34.5/138 kV | 11 | $677,535.35  |   |
| Pawnee Switching Station - Lon Hill 345 kV | Javalina Tap - Molina 138 kV | 5 | $492,667.88  | 4402 |
| Laquinta - Lobo 138 kV | Bruni Sub 69\_1 138/69 kV | 11 | $362,601.82  |   |
| DCKT Lon Hill - North Edinburg 345 kV and Orange Grove Switching Station 138 kV | Airco Aep - Rincon 138 kV | 7 | $315,991.55  | 08TPIT0132 |
| DCKT Lon Hill - North Edinburg 345 kV and Orange Grove Switching Station 138 kV | Edroy - Smith 69 kV | 6 | $259,919.75  |   |
| Basecase | Rio Hondo - East Rio Hondo Sub 138 kV | 14 | $246,655.53  | 2014-S16 |
| Basecase | Liston GTC | 20 | $226,300.51  |   |
| Mercers Gap Sw - Comanche Switch (Oncor) 138 kV | Camp Bowie (Oncor) - Brownwood Switch 138 kV | 10 | $220,057.20  |   |
| Nelson Sharpe - Lon Hill 345 kV | Javalina Tap - Molina 138 kV | 4 | $184,885.97  | 4403 |
| Loyola Sub to Kleberg Aep 138 kV | Loyola Sub 69\_1 138/69 kV | 4 | $169,976.99  |   |
| Basecase | Zorillo to Ajo GTC | 4 | $99,715.22  | LRGV Import Project |
| Yellow Jacket - Fort Mason 138 kV | Fort Mason - Mason Aep 69 kV | 4 | $77,396.17  |   |
| DCKT Whitepint - Lon Hill and South Texas Project 345 kV | Airco Aep - Rincon 138 kV | 6 | $74,665.35  | 08TPIT0133 |
| Lon Hill 345\_138\_2 345/138 kV | Edroy - Smith 69 kV | 4 | $70,973.61  |   |
| Skidmore - Chase Field 69 kV | Edroy - Smith 69 kV | 6 | $25,316.05  |   |
| DCKT Ferguson - Granite Mountain and Wirtz - Starcke - Paleface 138 kV | Flat Rock Lcra - Wirtz 138 kV | 7 | $14,257.25  | 4465 |
| Lon Hill 345\_138\_2 345/138 kV | Airco Aep - Rincon 138 kV | 3 | $12,943.55  | 08TPIT0134 |
| Basecase | Wkn\_Bkr - Ena Snyder Wind 69 kV | 6 | $4,982.85  |   |
| Scurry Switch - Sun Switch 138 kV | Wolfgang - Rotan 69 kV | 4 | $712.25  | 2015 RTP ECO3 |

## Generic Transmission Constraint Congestion

There were three days of activity on the Zorillo – Ajo GTC, one day on the Panhandle GTC, one day on the Molina GTC, and fifteen days on the Liston GTC in January. There was no activity on the remaining GTCs during the Month of January.

## Manual Overrides for January

There were no manual overrides for the month of January 2016.

## Congestion Costs for Calendar Year 2016

The following table represents the top twenty active constraints for the calendar year based on the estimated congestion rent attributed to the congestion. ERCOT updates this list on a monthly basis.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Contingency** | **Binding Element** | **# of 5-min SCED Intervals** | **Estimated Congestion Rent** | **Transmission Project** |
| Villa Cavazos to Military Highway Aep (2)138/138 KV | Los Fresnos - Loma Alta Substation 138kV | 485 | $6,021,297  |   |
| Carrolton Northwest - Lewisville Switch 345 kV | Carrollton Northwest - Lakepointe Tnp 138kV | 536 | $1,197,521  |   |
| DCKT Gibbons Creek - Singleton 345 kV | Jewett - Singleton 345kV | 998 | $1,065,468  | 4485, 3937, 3950 (a,b) |
| DCKT Lon Hill - North Edinburg 345 kv and Orange Grove Switching Station 138 kV | Javalina Tap - Molina 138kV | 814 | $820,384  | 4401 |
| Bluff Creek T2 (3) 345/138 kV | Bluff Creek T1\_H 345/34.5/138kV | 636 | $677,535  |   |
| Wichita Falls Axfmr1 138/69 KV | Lake Wichita Switch - Wichita Falls 69kV | 82 | $555,087  | Lake Wichita Switch - Wichita Falls Switch 69 kV line |
| Pawnee Switching Station - Lon Hill 345 kV | Javalina Tap - Molina 138kV | 540 | $492,668  | 4402 |
| Carrolton Northwest - Lewisville Switch 345 kV | Lewisville Switch - Jones Street Tnp 138kV | 100 | $414,276  | 4282 |
| Sulphur Springs Switch Axfmr1l (3)345/138 KV | Forest Grove Switch - Eustace Southeast 138kV | 91 | $396,518  |   |
| Los Fresnos - Loma Alta Substation 138 kV | La Palma - Villa Cavazos 138kV | 289 | $363,510  |   |
| Laquinta - Lobo 138 kV | Bruni Sub 69\_1 138/69kV | 1064 | $362,602  |   |
| DCKT Lon Hill - North Edinburg 345 kv and Orange Grove Switching Station 138 kV | Airco Aep - Rincon 138kV | 698 | $315,992  | 08TPIT0132 |
| Adamsville - Evant 138 KV | Goldthwaite 9AT2 138/69kV | 277 | $293,318  |   |
| Elmcreek-Sanmigl 345kv | San Miguel 345\_138 Kv Switchyards ATAH 345/22.8/138kV | 2 | $271,318  |   |
| DCKT Lon Hill - North Edinburg 345 kv and Orange Grove Switching Station 138 kV | Edroy - Smith 69kV | 448 | $259,920  |   |
| Basecase | Rio Hondo - East Rio Hondo Sub 138kV | 1053 | $246,656  | 2014-S16 |
| Banquete to Stadium Aep (2)69/69 KV | San Diego Sub - San Diego 69kV | 145 | $245,110  |   |
| Basecase | Liston GTC | 1322 | $226,301  |   |
| Mercers Gap Sw to Comanche Switch (Oncor) 138 KV | Camp Bowie (Oncor) - Brownwood Switch 138kV | 529 | $220,057  |   |
| DCKT Marion - Zorn and Clear Springs 345 kV | Clear Springs AT1 345/138kV | 44 | $203,585  | 4462 |

# System Events

## ERCOT Peak Load

The unofficial ERCOT peak load for the month was 49,279 MW and occurred on January 11th during hour ending 08:00.

## Load Shed Events

None**.**

## Stability Events

None.

## Notable PMU Events

ERCOT analyzes PMU data for any significant system disturbances that do not fall into the Frequency Events category reported in section 2.1. The results are summarized in this section once the analysis has been completed.

There were no reportable events in January.

## TRE/DOE Reportable Events

ERCOT ISO Reported an EOP-004-2 loss of generation > 1,000 MWs and Disturbance Control Standard (DCS) event on January 26, 2016 at 23:25. A generator was manually tripped with approximately 1,333 MWs due to a failure of a circuit card causing a low water level in the steam generator. Prior to recovery of the frequency event, frequency declined again due to the run back and trip of 307 MW due to low furnace pressure. ERCOT Frequency initially dropped to 59.729 Hz and recovered in approximately 5 minutes 32 seconds.

## New/Updated Constraint Management Plans

None.

## New/Modified/Removed SPS

None.

## New Procedures/Forms/Operating Bulletins

None.

# Emergency Conditions

## OCNs

None.

## Advisories

|  |  |
| --- | --- |
| **Date and Time** | **Description** |
| 01/18/16 10:11 | ERCOT issued an Advisory due to Physical Responsive Capability being below 3000 MW. |
| 01/21/16 20:17 | ERCOT issued an Advisory due to Physical Responsive Capability being below 3000 MW. |

## Watches

None.

## Emergency Notices

None.

# Application Performance

ERCOT system applications performed well in January. There were no issues to report.

## TSAT/VSAT Performance Issues

None.

## Communication Issues

None.

## Market System Issues

None.

# Appendix A: Real-Time Constraints

The following is a complete list of constraints activated in SCED for the month of January. Full contingency descriptions can be found in the Standard Contingencies List located on the MIS secure site at Grid 🡪 Generation 🡪 Reliability Unit Commitment.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Contingency** | **Constrained Element** | **From Station** | **To Station** | **# of Days Constraint Active** |
| SVCAMIL8 | LOMA\_A\_L\_FRES1\_1 | L\_FRESNO | LOMA\_ALT | 6 |
| DCRLLSW5 | 591\_\_A | LKPNT | CRLNW | 9 |
| DGIBSNG5 | 240\_\_A | JEWET | SNG | 9 |
| DLONOR58 | JAVALT\_MOLINA1\_1 | JAVALTAP | MOLINA | 11 |
| XBL2U58 | BLUF\_CRK\_T1\_H | BLUF\_CRK | BLUF\_CRK | 11 |
| XWFA89 | 6945\_\_A | LKWSW | WFALS | 1 |
| SPAWLON5 | JAVALT\_MOLINA1\_1 | JAVALTAP | MOLINA | 5 |
| DCRLLSW5 | 590\_\_A | LWSSW | LWVJS | 1 |
| XSSP58 | 975\_\_E | FGRSW | EUSSE | 4 |
| SL\_FLA\_8 | LA\_PAL\_VCAVAZ1\_1 | LA\_PALMA | VCAVAZOS | 2 |
| SLAQLOB8 | BRUNI\_69\_1 | BRUNI | BRUNI | 11 |
| DLONOR58 | AIRCO4\_RINCON1\_1 | RINCON | AIRCO4 | 7 |
| SADALAM8 | GOLDTH\_9AT2 | GOLDTH | GOLDTH | 2 |
| DELMSAN5 | SANMIGL\_ATAH | SANMIGL | SANMIGL | 1 |
| DLONOR58 | EDROY\_SMITH1\_1 | SMITH | EDROY | 6 |
| BASE CASE | RIOHND\_ERIOHND\_1 | MV\_RIOHO | RIOHONDO | 14 |
| SBANCAL9 | SND\_SAN\_\_1 | SNDIEGS | SAN\_DIEG | 2 |
| BASE CASE | LISTON |   |   | 20 |
| SZEPCMN8 | 670\_\_B | BRNSW | CMPBW | 10 |
| DMARZOR5 | CLEASP\_AT1 | CLEASP | CLEASP | 1 |
| DMCSCDH8 | 3130\_\_B | INDST | CMPST | 2 |
| SN\_SAJO5 | JAVALT\_MOLINA1\_1 | JAVALTAP | MOLINA | 4 |
| SKLELOY8 | LOYOLA\_69\_1 | LOYOLA | LOYOLA | 4 |
| SSIXSIL8 | SILASRAY\_T1 | SILASRAY | SILASRAY | 1 |
| SPAWLON5 | AIRCO4\_RINCON1\_1 | RINCON | AIRCO4 | 2 |
| SMCEABS8 | ABNW\_ELYT1\_1 | ABNW | ELYT | 1 |
| BASE CASE | ZO\_AJO |   |   | 4 |
| SLA\_RIO8 | PAREDS\_CNTRLAV\_1 | PAREDES | MV\_CNTRA | 2 |
| SFORYEL8 | FORTMA\_MASN1\_1 | FORTMA | MASN | 4 |
| DWH\_STP5 | AIRCO4\_RINCON1\_1 | RINCON | AIRCO4 | 6 |
| DJEWSNG5 | JK\_TOKSW\_1 | TOKSW | JK\_CK | 1 |
| XLO2N58 | EDROY\_SMITH1\_1 | SMITH | EDROY | 4 |
| SGRNCAD8 | G138\_1BB\_1 | GRNBELT | TEJAS | 1 |
| SLAQLOB8 | JAVALT\_MOLINA1\_1 | JAVALTAP | MOLINA | 2 |
| XLOB58 | FREER\_SAN\_DI1\_1 | SAN\_DIEG | FREER | 1 |
| SSKISIN9 | EDROY\_SMITH1\_1 | SMITH | EDROY | 6 |
| DKOCNUE8 | CHAMPL\_WEIL\_T1\_1 | WEIL\_TRC | CHAMPLIN | 1 |
| SLOBSAN5 | FREER\_LOBO1\_1 | LOBO | FREER | 1 |
| BASE CASE | PAREDS\_CNTRLAV\_1 | PAREDES | MV\_CNTRA | 2 |
| SSACSUN8 | 6474\_\_A | SUNSW | MGSES | 1 |
| SBOSELM5 | 1030\_\_B | BOSQUESW | RGH | 2 |
| BASE CASE | PNHNDL |   |   | 1 |
| DFERPAL8 | 38T365\_1 | WIRTZ | FLATRO | 7 |
| DSNGZEN5 | SNGTB\_74\_A | SNG | TB | 2 |
| SGILNU78 | GILA\_MORRIS1\_1 | GILA | MORRIS | 2 |
| XLO2N58 | AIRCO4\_RINCON1\_1 | RINCON | AIRCO4 | 3 |
| BASE CASE | MOLINA |   |   | 7 |
| DAUSLOS5 | CKT\_3122\_1 | FPPYD2 | HOLMAN | 1 |
| BASE CASE | JAVALT\_MOLINA1\_1 | JAVALTAP | MOLINA | 2 |
| SCOLBAL8 | BALG\_HUMBLT1\_1 | BALG | HUMBLTAP | 2 |
| XLO2N58 | BONIVI\_RINCON1\_1 | RINCON | BONIVIEW | 2 |
| SPAWLON5 | BONIVI\_RINCON1\_1 | RINCON | BONIVIEW | 1 |
| DLONOR58 | LOYOLA\_69\_1 | LOYOLA | LOYOLA | 1 |
| BASE CASE | SNYDER\_WKN\_BK1\_1 | ENAS | WKN\_BKR | 6 |
| DWH\_STP5 | BONIVI\_RINCON1\_1 | RINCON | BONIVIEW | 2 |
| DGRSLNC5 | ABSO\_VINSON1\_1 | ABSO | VINSON | 1 |
| SBRTORA8 | GRMSW\_FMR1 | GRMSW | GRMSW | 3 |
| SBRAUVA8 | EAGLHY\_ESCOND1\_1 | EAGLHYTP | ESCONDID | 3 |
| SBRAUVA8 | HAMILT\_MAVERI1\_1 | HAMILTON | MAVERICK | 1 |
| SSKISIN9 | EDROY\_MATHIS1\_1 | EDROY | MATHIS | 1 |
| DEMSSAG8 | 6265\_\_A | EMSES | MRSDO | 1 |
| DLONOR58 | BONIVI\_RINCON1\_1 | RINCON | BONIVIEW | 1 |
| BASE CASE | BLUF\_HRSE\_1A\_1 | H\_HOLLOW | BLUF\_CRK | 1 |
| DBIGKEN5 | CTHR\_SONR1\_1 | SONR | CTHR | 1 |
| SSPUASP8 | ROTN\_WOLFGA1\_1 | WOLFGANG | ROTN | 1 |
| DAUSSND5 | 211T147\_1 | GILLCR | MCNEIL\_ | 1 |
| SPAWLON5 | EDROY\_SMITH1\_1 | SMITH | EDROY | 3 |
| DFERPAL8 | 318T313\_1 | WIRTZ | JOHNCI | 2 |
| SSCUSUN8 | ROTN\_WOLFGA1\_1 | WOLFGANG | ROTN | 4 |
| DWIRGRA8 | 38T365\_1 | WIRTZ | FLATRO | 1 |
| SBOSELM5 | WHTNY\_FMR2 | WHTNY | WHTNY | 1 |
| BASE CASE | NWF\_NOTSW\_1 | NWF | NOTSW | 2 |
| DLONOR58 | SND\_ORAN\_1 | SNDIEGS | ORNGROV | 1 |
| SMCEABS8 | 6585\_\_A | ESKSW | TRNT | 1 |
| SNEDLON5 | JAVALT\_MOLINA1\_1 | JAVALTAP | MOLINA | 1 |
| SBEVASH8 | DIL\_COTU\_1 | DILLEYSW | COTULAS | 1 |
| SCHYWIN8 | 6100\_\_F | NOTSW | DHIDE | 1 |
| SELMTH25 | WHTNY\_MR2L | WHTNY | WHTNY | 1 |
| DSTPWHI5 | BLESSI\_LOLITA1\_1 | BLESSING | LOLITA | 1 |
| DTOKJK\_5 | 240\_\_A | JEWET | SNG | 1 |
| DHILELM5 | MAR\_SKY\_1 | MARION | SKYLINE | 1 |
| DHILELM5 | SKYLINE\_MR3H | SKYLINE | SKYLINE | 1 |
| SPAWLON5 | AIRCO4\_NCARBI1\_1 | AIRCO4 | NCARBIDE | 1 |
| DLONOR58 | BEEVIL\_ERALIO1\_1 | ERALIO | BEEVILLE | 1 |
| SZEPCMN8 | 670\_\_C | CMPBW | BRNSO | 1 |
| BASE CASE | RIOHND\_ERIOHND\_1 | RIOHONDO | MV\_RIOHO | 3 |
| BASE CASE | LAREDO |   |   | 1 |
| DGIBSNG5 | 260\_A\_1 | JEWET | SNG | 1 |
| XLO2N58 | EDROY\_SMITH1\_1 | EDROY | SMITH | 1 |