



Delivery Point Voltage Regulation

TVA Power Quality
April 2020

Voltage Regulation

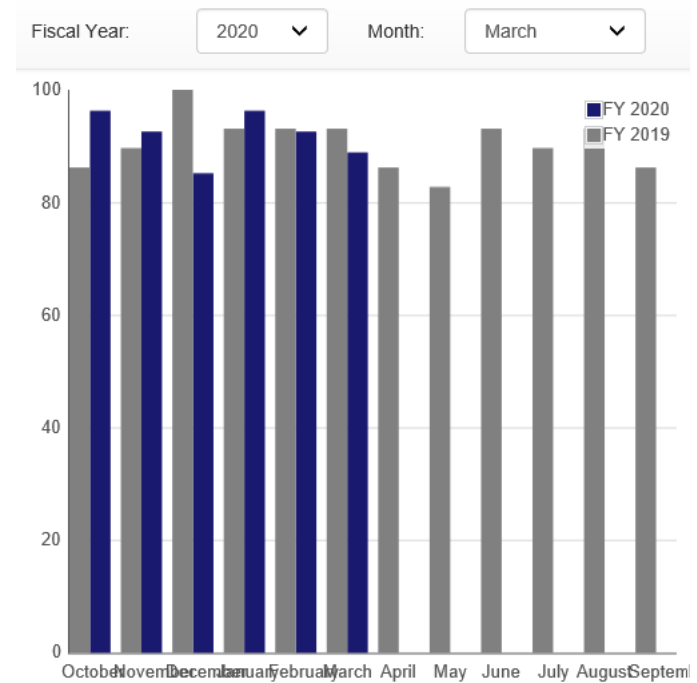
- **Normal Wholesale Delivery Voltage (NWDV):** voltage service as defined in delivery point contracts
 - Example: 161,000 V
- Contracts provision delivery at (+/-) 3% of NWDV
- TVA conducted proof of concept study utilizing data from 5 local power companies over a 12-month period
- Collaborated with GPA to develop automated meter aggregation and data visualization tool

Web Application – VoltREG

- Integrates once a month with TVA metering database to canvas hourly average voltage from 1500+ meters
- Raw data converted to metered voltages utilizing instrument ratios and transformer configuration
- Data validated and conditioned for both quality and quantity
- Visualization tool displays meter point dashboard for performance within 3% target bandwidth

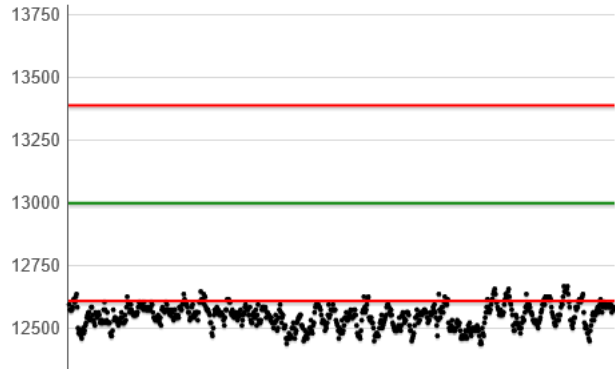
Web Application – VoltREG

0300265 13kV Total	0300200 13kV Total	0300270 13kV Total	0300301 13kV Total	0300258 13kV Total	0300460 13kV Total	0300160 13kV Total
0300150 13kV Total	0300261 Bank 2	0300501 13kV Total	0300260 46kV Total	0300425 13kV Total	0300451 69kV Total	0300255 13kV Total
0300560 13kV Total	0300709 161kV Total	0300549 13kV Total	0300250 13kV Total	0300251 Bank 1	0300070 161kV Total	0300210 13kV Total
0300400 13kV Total	0300491 13kV Total	0300430 13kV Total	0300256 13kV TOTAL	0300130 Bank 1	0300455 13kV Total	0300050 Bank 2
0300195 13kV Total						

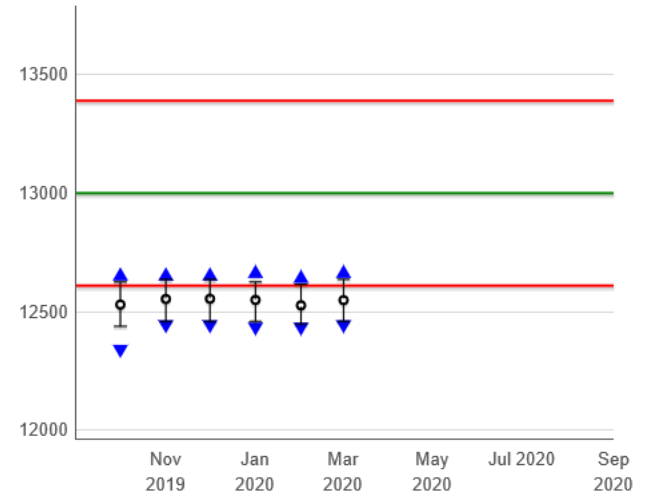


Example Meter Point – Failed Criteria

Hourly Metered Data for 3/2020

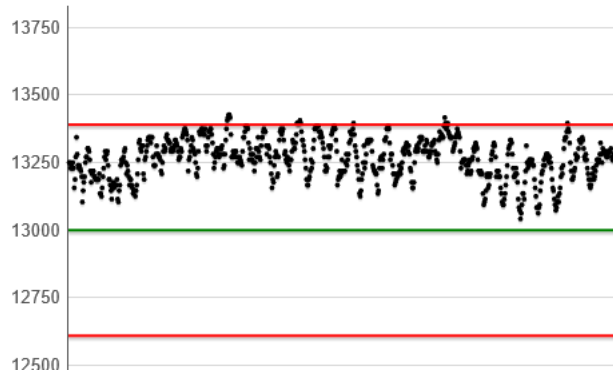


Fiscal Year-to-Date Statistics - FY: 2020

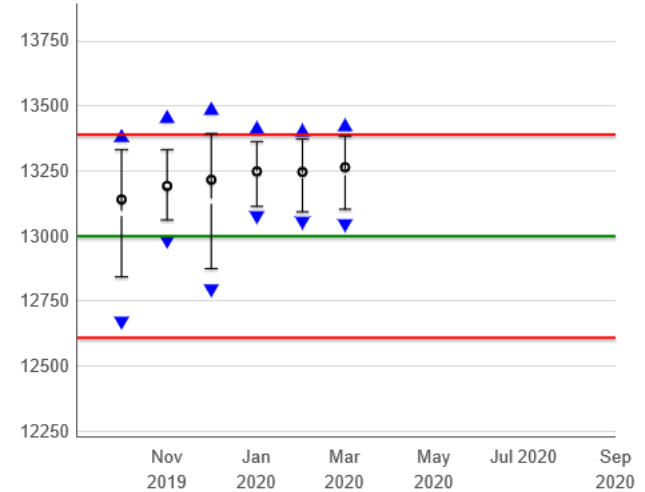


Example Meter Point – Passed Criteria

Hourly Metered Data for 3/2020



Fiscal Year-to-Date Statistics - FY: 2020

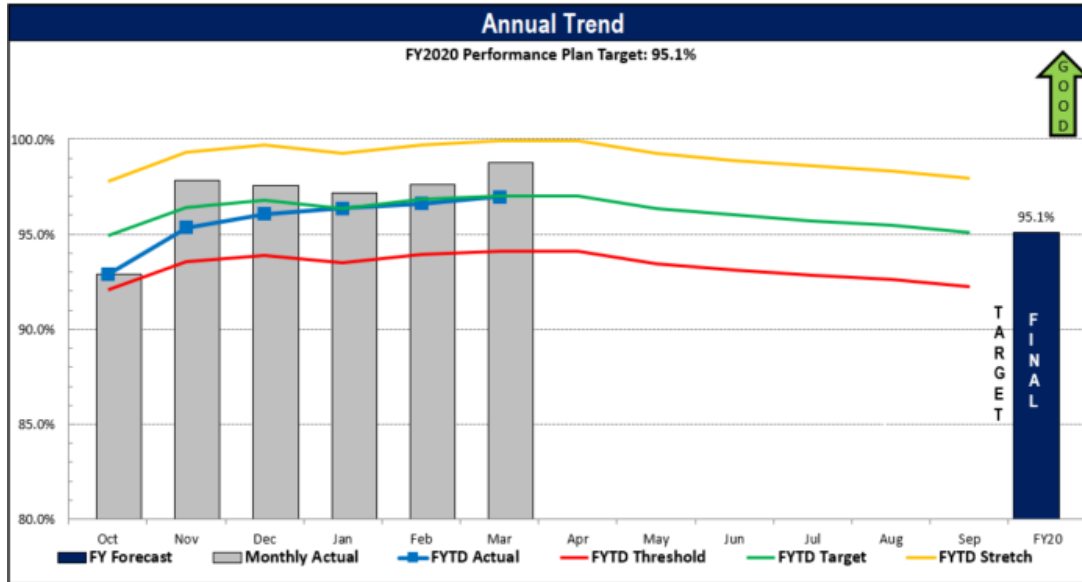


Actions & Challenges

- Identify voltage excursion trends (seasonal, regional, etc.)
- Equip Transmission Operators and Transmission Planners with data to effect change
- *Meter point \neq contractual delivery point in most cases*
- *Metered bus may be regulated or managed to optimize incentive programs*

TVA Metric Reporting

- Delivery Point Voltage Variation – monthly max and min compared to monthly average



Most Impacted LPC (Month)	
LPC NAME	DELIVERY POINT EXCURSIONS
Utility 1	4
Utility 2	3
Utility 3	3
Utility 4	1
Utility 5	1
Utility 6	1
Utility 7	1
Utility 8	1
Utility 9	1
Utility 10	1

Most Impacted LPC (FY)	
LPC NAME	DELIVERY POINT EXCURSIONS
Utility A	23
Utility B	20
Utility C	18
Utility D	15
Utility E	11
Utility F	10
Utility G	9
Utility H	9
Utility I	8
Utility J	8
Utility K	7

