

Wind Farm Voltage Control

Hopkins Ridge, Wild Horse, & Vantage



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August 23rd, 2011

Wind Farm SCADA Systems

- Vestas Windman
 - Hopkins Ridge
 - Wild Horse
- General Electric Wind Farm Management System (WFMS)
 - Vantage – operated by Invenergy







Unique Voltage Control Equipment

- DVAR – Wild Horse
 - American Superconductor
 - Highspeed PLC
 - Dynamic Reactive Power
- DSTATCOM – Hopkins Ridge
 - S&C Electric Company
 - Dynamic Reactive Power
 - Highspeed PLC and continuous onboard reactive power



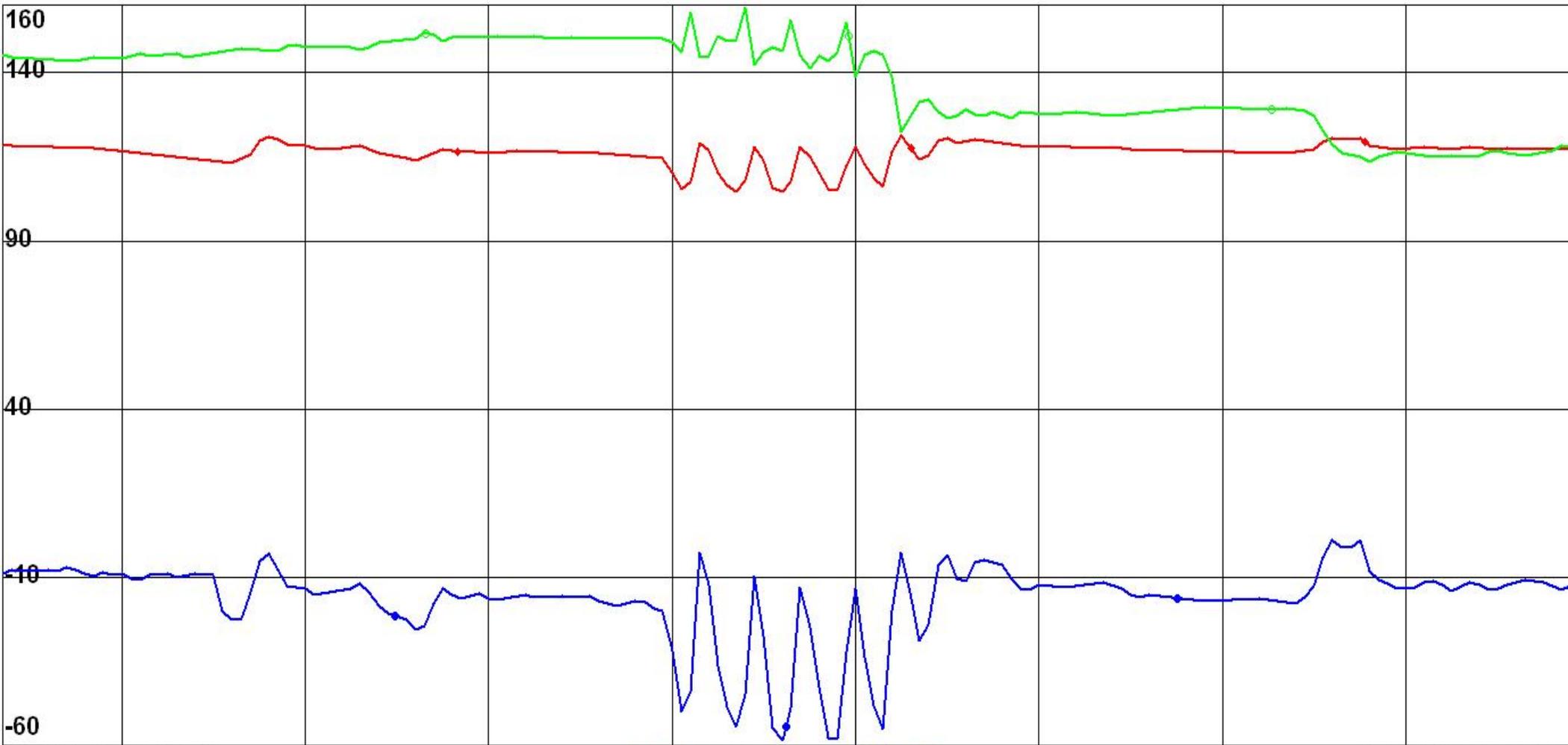


How are these systems used?

- DSO 216
- Environmental Redispatch
- Interconnection Agreements
- Balancing and Regulation Control
- Correct Deployment of Contingency Reserve Obligation



Hopkins Ridge System Voltage Collapse



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42.68 minutes

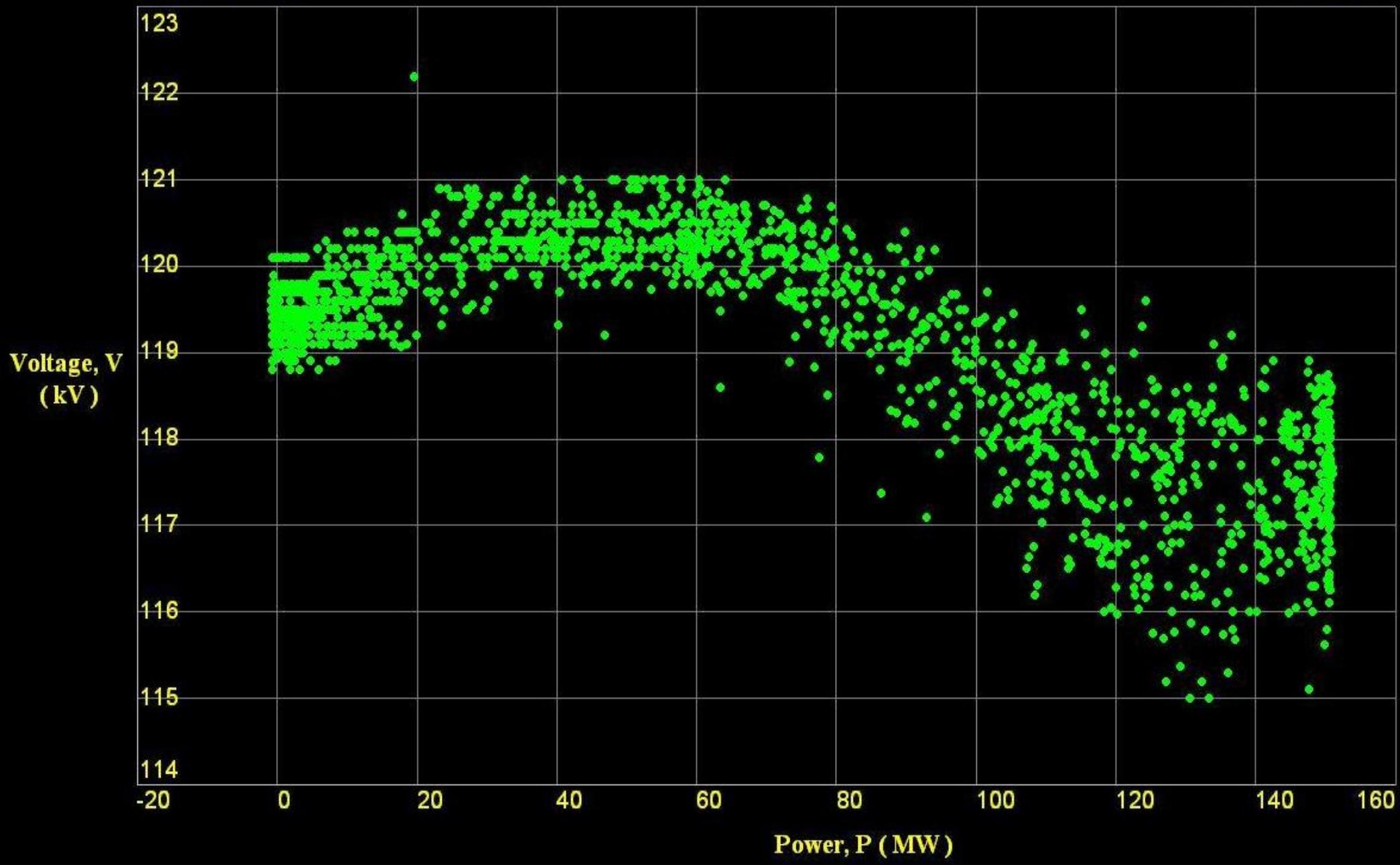
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- SUBSTN.HPR.LINE.HPR_115_LINE.ALOG.MVAR
- SUBSTN.HPR.LINE.HPR_115_LINE.ALOG.MW
- ♦ SUBSTN.HPR.LINE.HPR_115_LINE.KV.KV



Hopkins Ridge PV Curve Pre-DSTATCOM

6/1/10 to 6/8/10





Hopkins Ridge PV Curve
Post-DSTATCOM

6/1/11 to 6/8/11

