



High Voltage-Ride Through (HVRT) for Intermittent Renewable Resources (IRR)

ERCOT System Planning

November 5, 2015

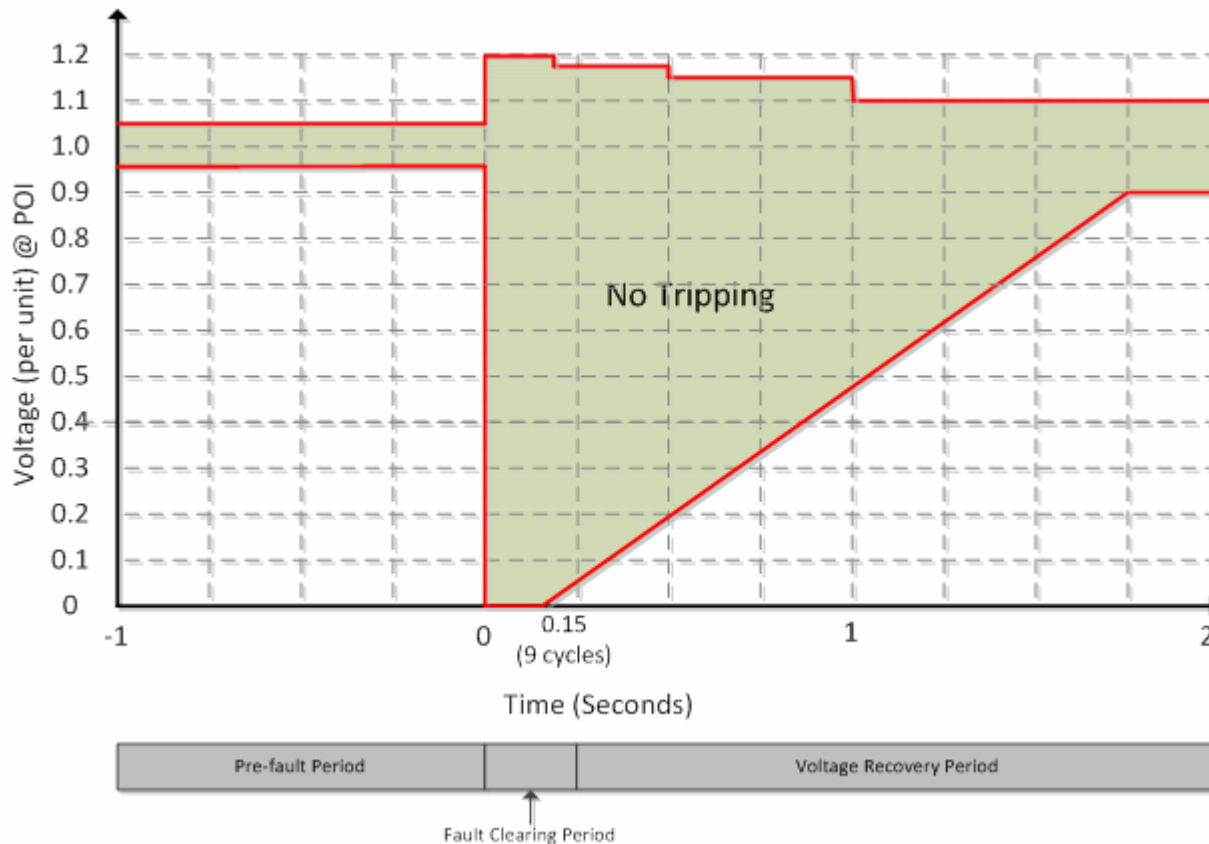
ROS Meeting



Agenda

- ERCOT VRT Requirements for IRRs
- IRR Dynamic Model HVRT Response
- Review of existing IRR technology
- Next Steps

VRT Requirements for IRRs



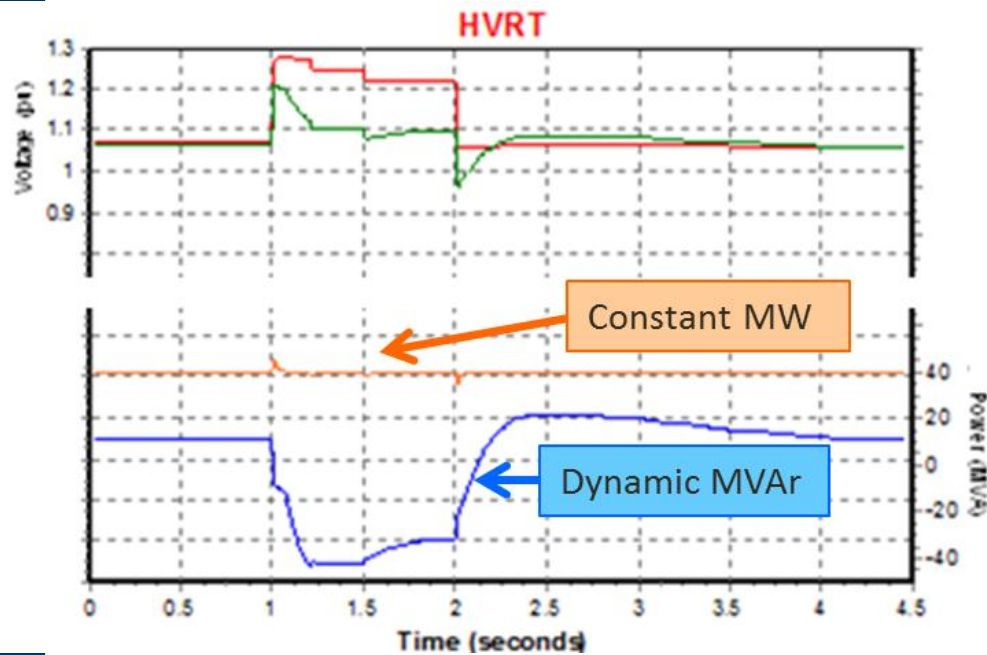
- Operating Guide 2.9.1 (5), Each IRR shall set generator voltage relays to **remain interconnected** to the ERCOT System during the following high-voltage conditions, as illustrated in Figure.

HVRT Requirements for IRRs

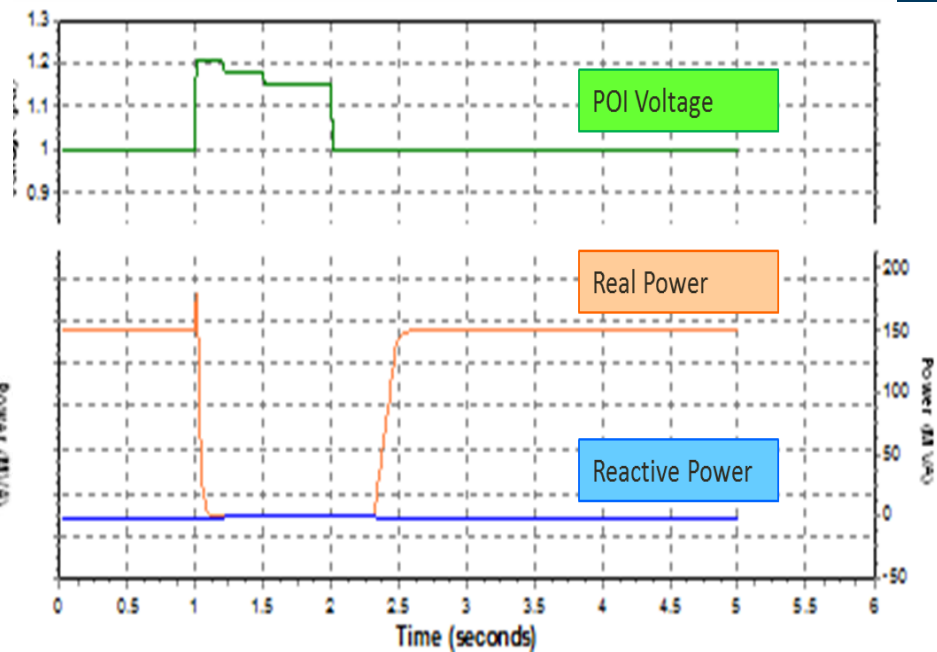
- For an event with HVRT, IRRs shall remain interconnected to the ERCOT System to
 - absorb reactive power when grid voltages go high
 - maintain real power output
 - If an event suddenly interrupts power flow,
 - transmission loading will be reduced,
 - transmission line charging will dominate, injecting additional reactive power, and
 - higher voltage may cause generation disconnection if voltage exceeds the HVRT requirements

IRR Performance

Acceptable
Performance



Undesired
Performance



Status Today

- For the IRRs that provided all required financial security to the TSP after January 16, 2014, ERCOT and TSPs have reviewed their HVRT performance based on the wind turbine and PV inverter dynamic models.
- Most today have acceptable HVRT performance
 - Absorb reactive power and maintain real power

Next Steps

- ERCOT and TSPs will work with the Resource Entities and developers that have undesirable HVRT performance to discuss options for improving performance.
- ERCOT will consider proposing a NOGRR to HVRT clarify HVRT requirements.