# Renewable Generation Reserve Sharing Groups

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# Some Utilities Increasingly Impose Wind and Solar Variability and Uncertainty Integration Charges

*Renewable Reserve Sharing Groups may provide a way to help reduce or eliminate those charges by supplying access to resources to meet reliability requirements rather than payments to the host utility*

# Wind & Solar Impact Balancing Requirements in Two Distinct Ways

Minute-to-minute variability of wind and solar generator output adds to load variability and increases Balancing Area regulation requirements

- Minute-to-minute variability of wind and solar generator output tends to be minimal and is reduced through diversity as the renewable generation fleet grows

Large, but rare, drops in wind or solar output, under adverse weather and load conditions and during limited availability of conventional generation, can exceed the *ramping* capability of online conventional generators

- In some cases, insufficient ramping capacity from the utility's online conventional generators during a single five-minute interval in ten years of simulation leads to an increased reserve requirement and increased costs

# Sudden Drops in Wind or Solar Output Are Similar to Conventional Generation Contingencies …

Events are large but rare

Do not qualify for contingency reserve use because they are too slow

- They are ramping events that take tens of minutes to unfold rather than being instantaneous
- NERC disturbance control standard requires rebalancing within 15 minutes and reserve restoration within 105 minutes
- Increasing regulation resources rather than contingency-type reserves is very expensive

*The reserve sharing group concept may be a better alternative*

# Contingency Reserve Sharing Groups Are Common and Work Very Well

Contingency events are rare, it is unlikely that two generators in different balancing areas will fail simultaneously

- The reserve sharing group only needs enough reserves to cover the largest credible contingency within the group, greatly reducing the total reserve requirements – everyone saves

Wind and solar drops are similarly rare and non-synchronized

- Sharing reserves among multiple renewable generators could significantly reduce costs to all
- The reserve sharing group could find the least-cost reserve technology available in their area (excess on-line generation, fast-start generators, demand response, storage)

# NERC Currently Recognizes Three Types of Reserve Sharing Groups

Contingency Reserve Sharing Groups

- Very common – NERC lists 11

Frequency Response Reserve Sharing Groups

- Western Frequency Response Sharing Group (WFRSG) is currently the only one

Regulation Reserve Sharing Groups

- No active Regulation Reserve Sharing Groups listed

*Renewable Reserve Sharing Groups are very similar to Contingency Reserve Sharing Groups, though operating over a slightly longer time frame. There does not appear to be any technical reason that NERC would not allow them to form*

# Forming Renewable Reserve Sharing Groups

Existing Contingency Reserve Sharing Groups could expand the services they offer

Renewable generators could form their own renewable reserve sharing groups

- Obtain responsive resources through ownership or contract
- Provide the response capability to the host utility to deal with wind and solar drops in lieu of paying wind and solar integration charges

# Defining Response Requirements is Important

Contingency response requirements are well defined in NERC standards

- A contingency event is declared
- Normal balancing requirements are suspended
- Balance must be restored within 15 minutes
- Reserves must be restored within 105 minutes

Non-contingency balancing requirements are also well defined in the NERC BAL-002 standard

- They are both more and less stringent
- Balance is measured every minute, but balancing requirements are statistical over a year
- Rebalancing is required within 30 minutes, but only if the imbalance is hurting interconnection frequency

Host utilities should specify the balancing needs (event frequency, size, duration) that underly their Renewable Integration Charges

# Conclusions

*Contingency reserve sharing groups have worked extremely well at reducing the cost of reliably responding to large, infrequent, conventional generator failures by spreading the risk over multiple participants*

*A similar approach could work for wind and solar generators*

*If existing reserve sharing groups are unwilling or unable to expand their services to cover rare wind and solar ramping events (with additional resources), it may be possible for wind and solar generation owners to create Renewable Generation Reserve Sharing Groups as an alternative approach*

# Contact Information

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