



Substation Backfeeding

Ensuring Operational Reliability While Enabling DER Penetration

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AGENDA

- Industry Interpretation of PSEG-LI Approach
 - *Constraints Due to Approach*
 - *Diagrammatic Explanation*
- Industry Concerns
- Approaches by Other Utilities
- Industry Recommendations



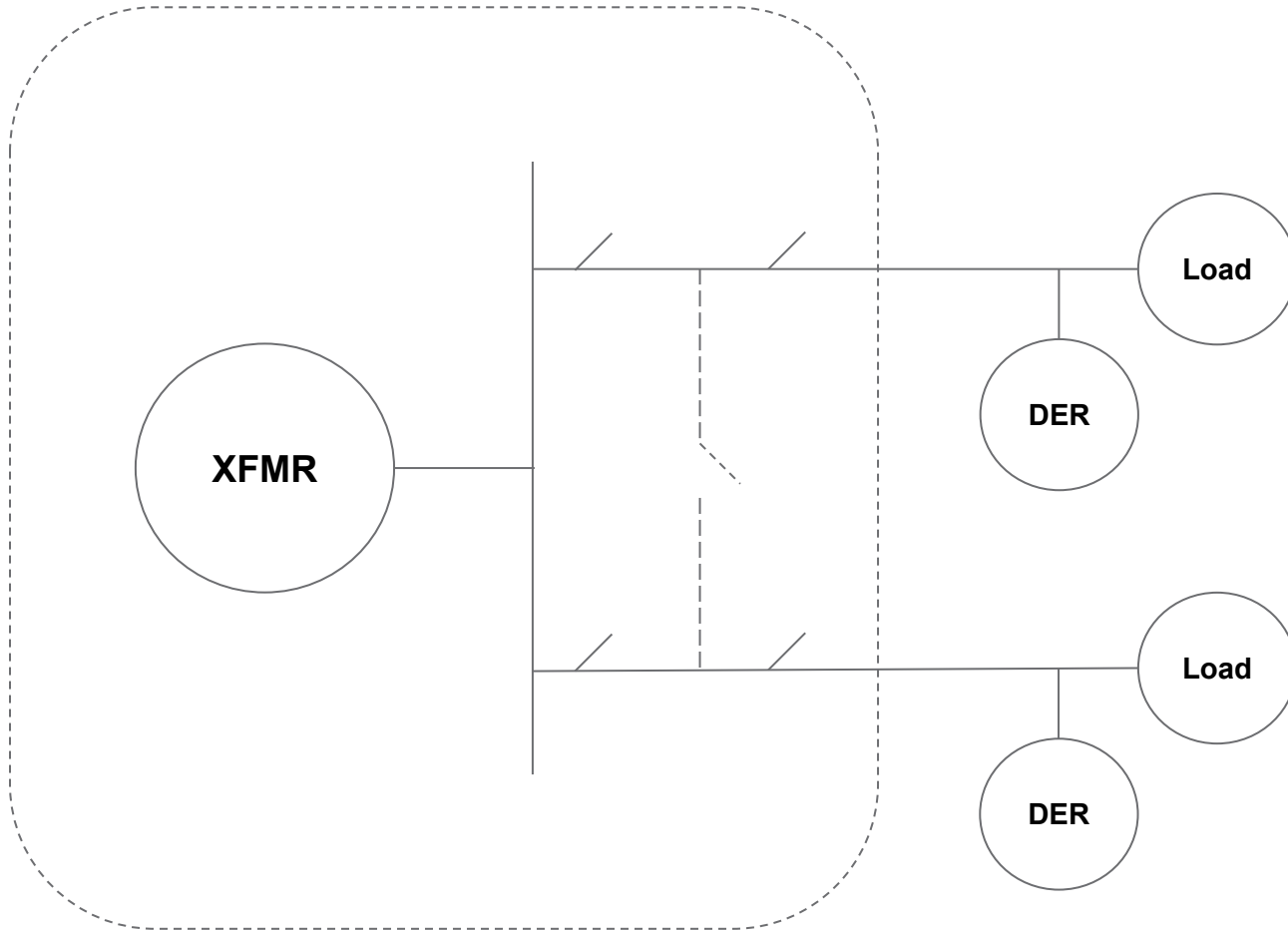
Substation Backfeeding

Industry Interpretation of PSEG-LI Approach - System Constraints

- **Circuit Operational Constraints Limit Amount of DER Allowed to Interconnect to Existing Infrastructure**
 - PSEG-LI concerned about load masking caused by excessive generation when Operations team is looking into possible contingency scenarios
- **Maximum of 3MW of Aggregate DER Allowed on Feeders**
 - Anything more will require an express feeder to interconnect
 - Threshold calculated using typical circuit thresholds described in next slides

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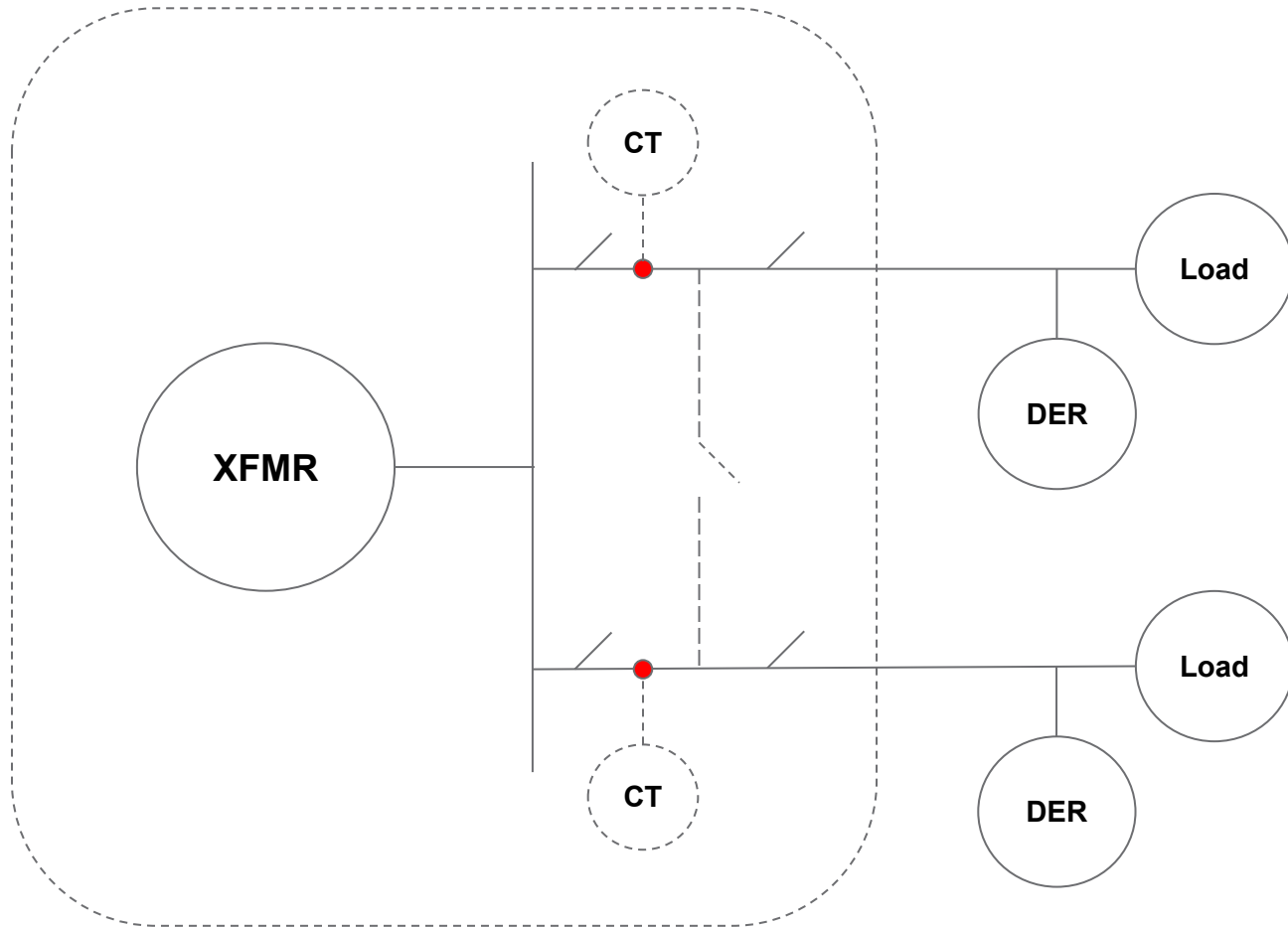
Industry Interpretation of PSEG-LI Approach - Diagram Walkthrough of PSEG-LI Concerns



- Simplified distribution substation with transfer switch for feeder contingency conditions

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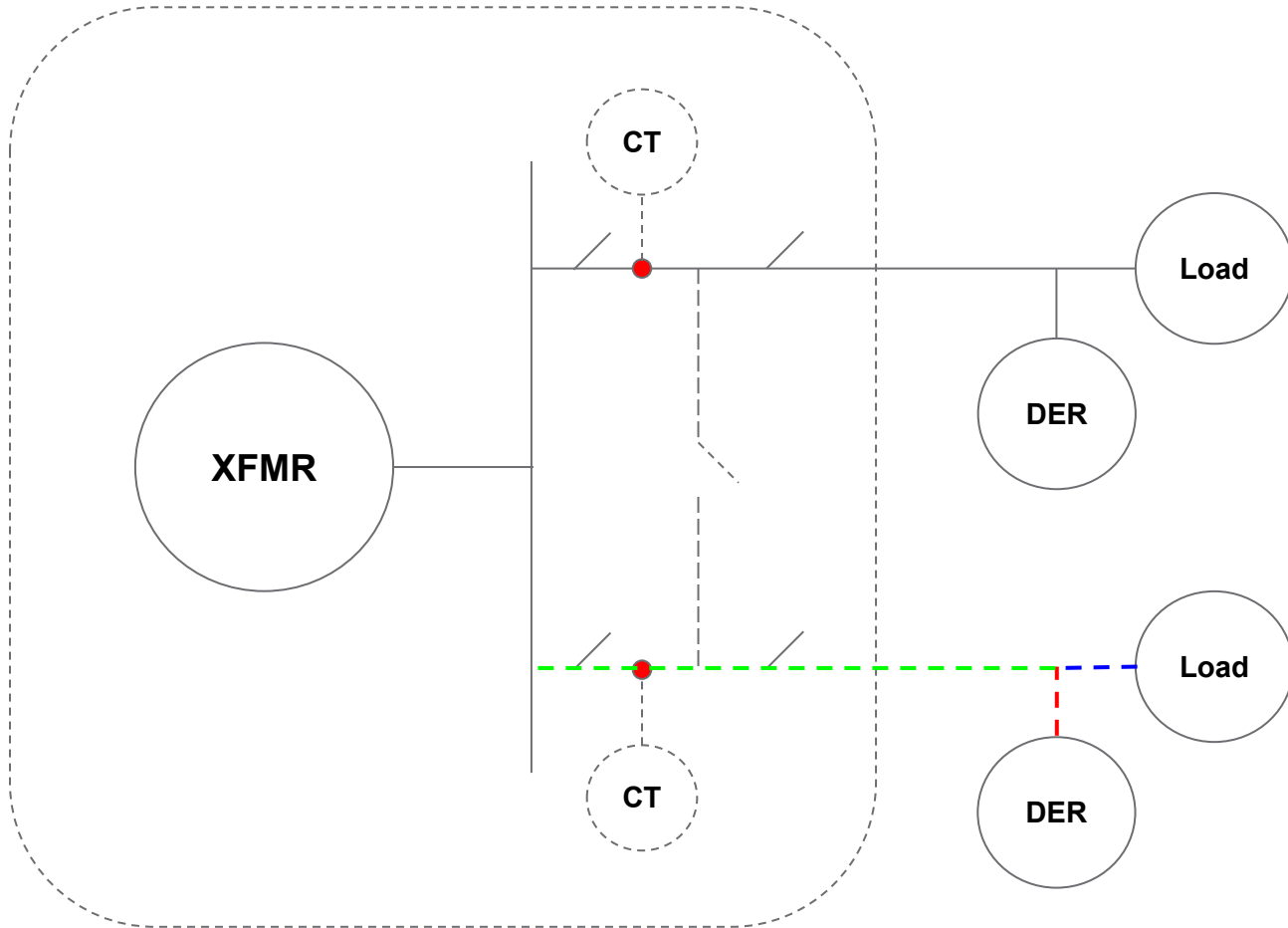
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- Current Transformers at each feeder head so that the Operations team can monitor load

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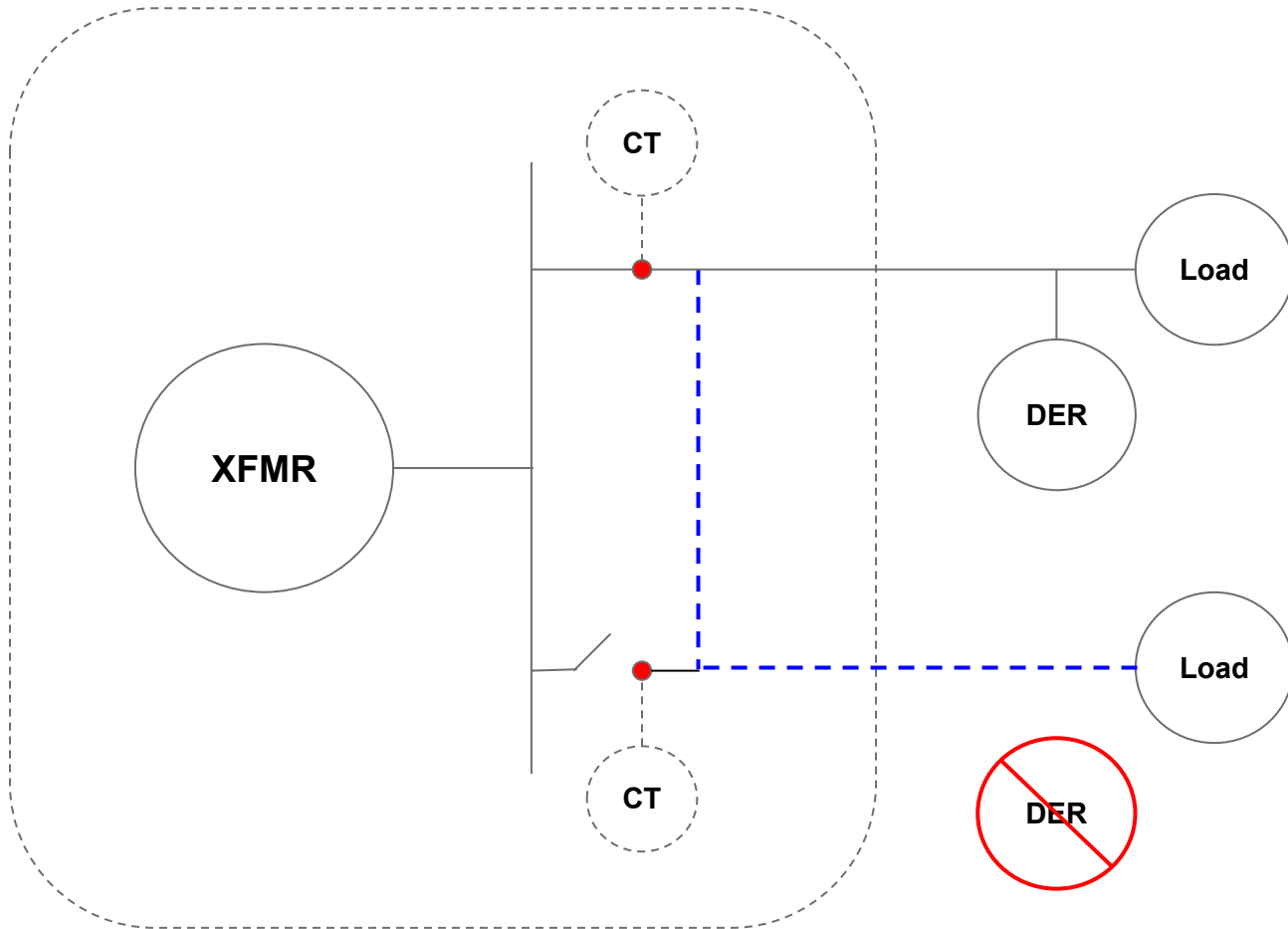
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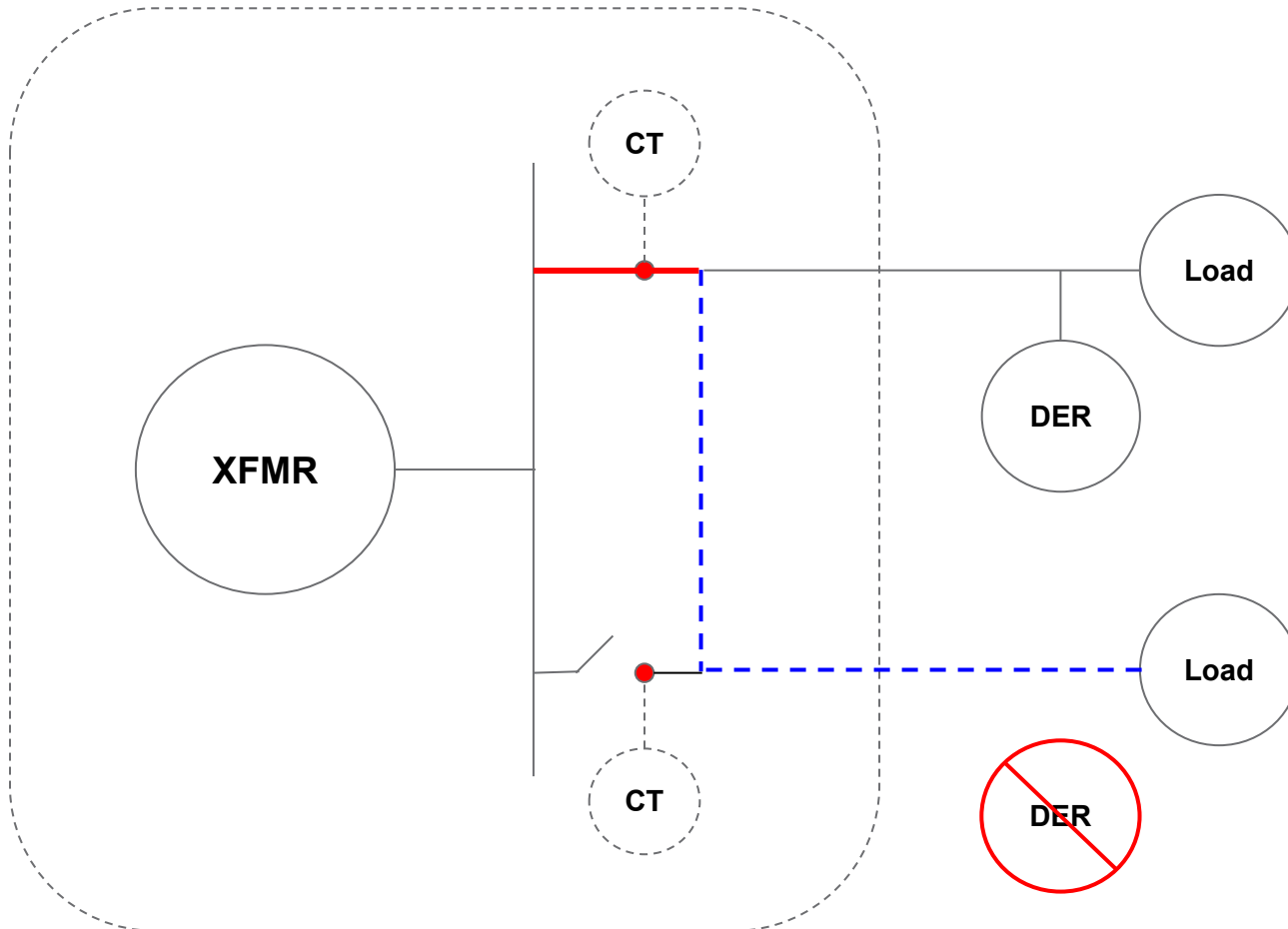
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- Then, when switching into a contingency condition when the DER is offline, the Operators are assuming there is less load than what is actually on the feeder

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- This could lead to **thermal overloads** on the adjacent feeder due to there being higher load than what the Operator was expecting

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Industry Concerns with PSEG-LI Practice

- **Alternative Solutions Provided by PSEG-LI make Projects Infeasible**
 - Express Feeder Solution - Cost can be in excess of \$2 Million. No project can absorb that much for just cost to interconnection
 - Downsizing Solution - Requires projects to downsize to a small percentage of their original system size making them infeasible. (Ex. 5 MW to 500 kW)
 - Extension to Different Feeder Solution - In some cases, PSEG-LI has suggested developers attempt to interconnect to a different circuit from the one adjacent to their site. These circuits are typically very far from the proposed POI and are likely cost prohibitive
- **Based on NYSEIA Member Experience, No Other Utilities in Advanced DER Markets Apply This Methodology, Including**
 - None of the members of the Joint Utilities of New York apply this methodology to their circuits
 - No Massachusetts Utilities apply this methodology
 - No California Utilities apply this methodology
 - No Maine Utilities apply this methodology
- **Technical Solution to This Concern Has Been Available and In Use for Years**
 - All the utilities mentioned above have found technical solutions to this concern
 - Substation and Feeder-Head backfeeding has been allowed in some utility territories for over 5 years
- **The Limitations on DER This Methodology Imposes Are Misaligned with New York State's Renewable Energy Goals**

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Current Practices by Other Utilities

- **For Large Projects (1 MW+)**
 - Utilities require SCADA site monitoring to provide real-time data to their Operations team
 - Operations team, or automated software, reviews output data for DER to determine amount of load masking prior to switching to contingency
- **For Medium Projects (500 kW+)**
 - Utility dependent approach to medium sized DER
 - Some Utilities require real-time monitoring data for medium projects
 - Other Utilities modify review process for Operations team and always assume medium DERs are operating at full capacity when making contingency decisions
- **For Small Projects (<500 kW)**
 - Track aggregate number of small DER and assume they are operating at full capacity with maximum load masking when making contingency decisions
 - Some Utilities are looking into low-cost monitoring and control solutions for small DER, however, this is primarily concerned with advanced inverter functions and active curtailment, not substation backfeeding

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Industry Recommendations

- **PSEG-LI Adopt the Practices Utilized by Other Utilities to Mitigate Backfeeding Concern**
 - Use SCADA site monitoring for large systems to provide real-time generation data to their Operations team
 - Track aggregate Medium and Small DERs to determine circuit specific constant load-masking assumptions
- **Apply New Methodology to Projects In or Already Through the Interconnection Process**
 - Backtrack to ensure all projects currently queued or already evaluated can be restudied assuming the new mitigation is in place
- **Revise Hosting Capacity Maps to Account for Increased Capacity Derived from Methodology Change**