



TRANSMISSION ENGINEERING · STEP 01 · SYSTEM STUDIES · REPORT

Short Circuit & Switchgear Rating Study

Fault current calculations at all critical buses to confirm switchgear, CT and breaker ratings for the evacuation scheme.

Worked example (anonymised): Standalone BESS Evacuation Study · 400 MW / 800 MWh BESS · Western India. Grid-connected BESS tendered to a state DISCOM required a 220 kV evacuation scheme; system studies were used to confirm fault levels and stabilize voltage profiles at the point of interconnection.



Illustrative sample image

Sample excerpt · Fault Level Summary (3-Phase & Line-to-Ground)

Bus	3-Phase Fault (kA)	L-G Fault (kA)	Existing Breaker Rating (kA)	Adequate?
POI 220kV Bus	31.2	28.6	40	Yes
Substation A 220kV	33.5	30.1	40	Yes
BESS 33kV Collector	18.4	16.9	25	Yes
Substation B 132kV	22.7	20.3	25	Marginal - review
Substation C 220kV	29.8	27.2	40	Yes

Notes

- Marginal rating at Substation B flagged for utility discussion on upgrade
- Ratings cross-checked against manufacturer datasheets provided by client

What happens in this step

1. Collect grid network data, existing substation configurations and utility planning codes for the study area
2. Build load flow model in PSS/E or ETAP covering normal, N-1 and peak/off-peak conditions
3. Run short circuit studies to size switchgear and confirm fault ride-through requirements
4. Perform transient and voltage stability analysis for renewable/BESS injection scenarios



5. Conduct harmonic analysis against IEEE 519 / CEA limits, sizing filters where required
6. Evaluate 2-3 evacuation scheme alternatives on cost, redundancy and approval timelines
7. Present findings to utility planning cell and finalize point of interconnection

Outcomes

- Utility-approved evacuation scheme with defined point of interconnection and voltage level
- Switchgear and protection ratings confirmed before procurement, avoiding costly rework
- Documented compliance with CEA/IEEE grid code limits supporting faster interconnection approval
- Reduced project risk for lenders through independently validated stability and power quality findings

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ILLUSTRATIVE