



TRANSMISSION ENGINEERING · STEP 01 · SYSTEM STUDIES · REPORT

Harmonic & Power Quality Assessment

THD and individual harmonic order analysis at the point of interconnection against IEEE 519 and CEA limits, with filter sizing recommendations if needed.

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.

Sample excerpt · Harmonic Distortion Results at POI

Harmonic Order	Calculated (%)	IEEE 519 Limit (%)	Status
5th	1.8	4.0	Pass
7th	1.2	4.0	Pass
11th	0.9	2.0	Pass
13th	0.6	2.0	Pass
THD (Total)	2.9	5.0	Pass

Notes

- No filtering required at rated BESS output based on inverter harmonic profile
- Recommend re-verification post final inverter selection

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

Want this for your project? Write to info@growthifye.com or use the Contact page — we will scope the real deliverable set for your capacity, state and lender requirements.