

Critical Requirements for transformers employed in the BESS

Power Transformers and Reactors

PS1 – 1.2 What design and operation considerations should be included to optimize the selection of transformers for photovoltaic plant applications?

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Response

- For transformers to be fit for purpose on the renewable resources' applications, the design and operation requirements should include:
 - Harmonics
 - Frequent switching
 - Unbalanced loads

Response

- Harmonics
 - They are dependant on the inverter circuit designs, hence optimized transformer design will require inputs from the inverter circuit.
 - They are part of the reasons why the traditional distribution transformer were found not suitable for renewable resources applications.
 - The screening technique on the windings can be implemented to filter the harmonics.
- Frequent switching
 - This stresses the insulation quite often than for a usual transformer operational environment.
 - Increased safety margins from the transients point of view becomes necessary.

Response

- Unbalanced loads
 - They are mainly due to the inverter output
 - The winding conductors should be dimensioned for optimal losses and the cooling ducts sized for efficient cooling
 - Ester oils may be an added advantage for thermal performance.