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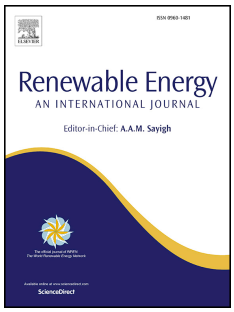

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Optimization–based reactive power control in HVDC–connected wind power plants

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Abstract

One application of high–voltage dc (HVdc) systems is the connection of remotely located offshore wind power plants (WPPs). In these systems, the offshore WPP grid and the synchronous main grid operate in decoupled mode, and the onshore HVdc converter fulfills the grid code requirements of the main grid. Thus, the offshore grid can be operated independently during normal conditions by the offshore HVdc converter and the connected wind turbines. In general, it is well known that optimized reactive power allocation might lower the component loading and power losses. This paper aims to propose and assess a reactive power allocation optimization within HVdc–connected WPPs. For these systems, the offshore converter operates the adjoining grid by imposing frequency and voltage. The reference voltage magnitude is used as additional control variable for the optimization algorithm. The loss function incorporates both the collection grid and the

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