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Experimental comparison of HAWTs with hydrostatic and regular transmissions HELBER ANTONIO ESQUIVEL-PUENTES, ANDREA VACCA, School of Mechanical Engineering, Purdue University, LEONARDO P CHAMORRO, Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, JOSE GARCIA-BRAVO, School of Engineering Technology, Purdue University, HUMBERTO BOCANEGRA-EVANS, DAVID WARSINGER, WALTER GUTIERREZ, LUCIANO CASTILLO, School of Mechanical Engineering, Purdue University — The performance of a horizontal axis wind turbine (HAWT) with hydrostatic transmission was compared with that of a standard unit using well-controlled experiments. The power output of the hydrostatic unit is used for electricity generation, and/or reverse osmosis to obtain fresh water. Furthermore, the hydrostatic transmission allows for moving the major electromechanical components located in the hub to the ground level. The associated changes resulted in reductions of approximately 30% of the total mass of the unit, and of about 7 to 14% of the cost of the energy. The reconfiguration of the structure of the turbine also implied changes in the response of the system to turbulence. We assessed such effects across scales considering changes in the transfer function of the spectrum of the power output, following Tobin *et al* (2015).

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