HYDRAULIC WIND POWER DROOP ANALYSIS

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The power transferred from the wind turbine to the generator is important to keep the systems active, power balance and droop frequency control when connected to a network. This is important to ensure maximum power output obtained from wind velocity. When there is a change present in the real power demand at a point in the network, it is reflected throughout the system by fluctuation in frequency. If a drop in frequency occurs the generator will decelerate at a rate determined by the moment of inertia plus all the masses connected to its shaft. This results in the conversion of kinetic energy of the generator to electrical energy thus giving a power surge. If there is an increase in the system frequency, the inverse is true.

Hydraulic wind power provides opportunities for multiple wind turbine energy collection and central generation. The system has many benefits over direct driver counterparts including simple structure and opportunities for energy storage units. However, as the system relies on hydraulic connection of wind turbine and generators, it exhibits a nonlinear power and speed characteristics. This poster will analyze the effect of increasing the hydraulic wind turbines on the droop characteristics of the system. Several wind speeds and loading conditions have determined that adding wind turbines to the hydraulic energy transfer system will increase the frequency stability of the system. Some of the hydraulic prime mover characteristics will be identified through experimental results from our prototype in Dr. Izadian's laboratory.

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