

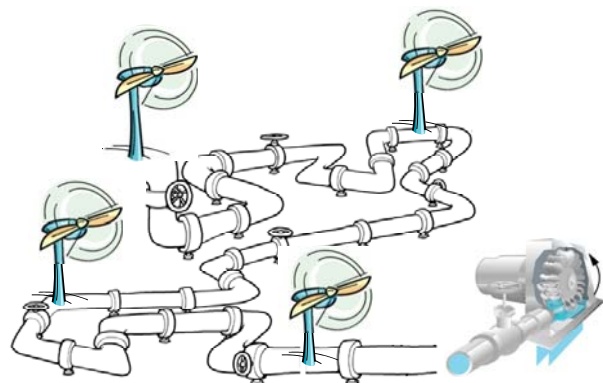


Centralized electricity generation in offshore wind farms using hydraulic networks

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Description:

This research explores a concept in which a centralized electricity generation within a wind farm is proposed by means of a hydraulic network using fluid power technology. This possible solution considers a new way of generation, collection and transmission of wind energy inside a wind farm in which electricity conversion does not occur during any intermediate conversion step before reaching an offshore central platform. The idea behind the concept is to



dedicate the individual rotors of the wind turbines to generate a pressurized flow of seawater. The flow is collected from the turbines and redirected through a network of pipelines to a central generator platform. Inside the platform, the overall pressurized flow is converted into mechanical and electrical power through an impulse hydraulic turbine. The electricity is generated in a centralized way without the need of a reservoir or dam as in conventional hydro power plants.

Goal:

To create a numerical model which can describe the main dynamic behavior of the proposed idea without the necessity of a detailed design or information. Since this concept has not been considered before in offshore wind, a suitable numerical model to represent the flow dynamics of hydraulic networks and its implementation is required. Furthermore, the stability of the system and control requirements need to be defined in order to perform time domain simulations under typical wind conditions.

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