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Hurricane wave energy harvesting

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Global warming has triggered changes in the climate that have led to hurricanes becoming stronger and mo frequent in recent years. In the past few decades, the frequency of category 4 and 5 hurricanes has increased this trend is predicted to continue into the future. Hydrokinetic conversion devices (HCDs), which harness energ from water ow, are an already established technology, with several prototypes deployed around the world. Howev these devices have a rated working velocity of only 1.5-3.0 m/s, whereas in a category 5 hurricane, wave spee up to 28 m/s are possible, which would render HCDs useless and even may sweep them on shore. erefore, a no approach to hydrokinetic conversion that o ers both a sturdy design and has rated velocities to match hurrican wave speeds is required. However, energy harvesting from hurricane waves is still relatively a nascent technol and needs to be developed further in order to be implemented commercially. is project's objective is to explore the available technology options for harvesting energy from hurricane waves. If a suitable device can be design the enormous energy of storm waves crashing on to hurricane infested coastlines can be converted to electricity be supplied to regions su ering from power outage as an a ermath of the hurricane. We have proposed two desig for achieving such ends. e rst device uses a moving plate and bellows system attached with a hydro-power loo situated behind a seawall, which could be scaled up to become a stationary power generation system. e seco design involves a composite seawall embedded with piezoelectric plates to produce electrical energy from the imp force of hurricane waves.

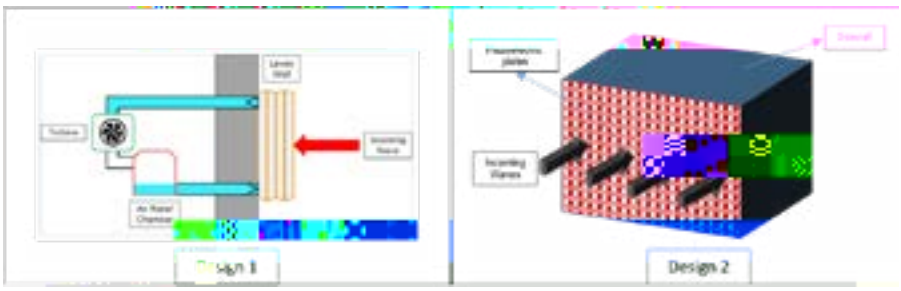

Figure: Designs proposed for harvesting energy from hurricane waves.

Biography

Mahpara Habib is a student under Dr Katherine Hornbostel's supervision at the Mechanical Engineering and Materials Science Department at the University of Pittsburgh. She is dedicated to developing materials that can harness energy from natural disasters and convert it into useful energy. At the present time, her work is focused on piezoelectric materials that can be utilized to capture energy from hurricane waves.

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