DFD20-2020-002542

Abstract for an Invited Paper
for the DFD20 Meeting of
the American Physical Society

On Fake Walls Along the USA/Mexico Border[1]

LUCIANO CASTILLO, Purdue University

Significant advances in technology offer unprecedented opportunities to bring the world together. However, recent mass migrations due to violence, lack of economic opportunities, and war have left many countries unprepared, and raised geopolitical tensions that led to man-made border dividers. Physical barriers also generate internal tension in many countries and exacerbate the rhetoric of us versus them. Moreover, mass migration will likely increase worldwide as climate change brings more extreme weather. In this talk, we detail the rationale for leveraging natural resources to produce renewable energy and water to create an economic corridor along the USA/Mexico border that will stimulate the economy and infrastructure development to mitigate migration. For instance, a frequent atmospheric phenomenon characterized by a relatively low-tropospheric maximum in the vertical profile of the horizontal winds, known as low-level jets (LLJ), may offer unexplored benefits to wind energy, specifically in the USA, South America, and the Caribbean. The processes modulating the interaction between LLJs and wind farms remain obscure; these include the role of the positive and negative mean shear around the velocity peak. By producing a synthetic LLJ under well-controlled laboratory conditions, we show that this phenomenon may enhance energy entrainment in the wake of wind turbines, and bring unique energy production in states along the USA/Mexico border.

[1]Project Support from the Kenninger Family and Purdue Research Foundation