

Title: NSF Engine: MOCEAN: Accelerating a Just Energy Transition While Nurturing Healthy Oceans and New Blue Economies Through Innovative Nature-Inclusive Offshore Wind Farms

NSF Engine PI/CEO/POC: Daniel Kuchma, Tufts University, 217-552-4988, dan.kuchma@tufts.edu

Anticipated Engine Co-PIs:

Robert Chen, University of Massachusetts-Boston, Boston, Massachusetts

Deidre Gibson, Hampton University, Hampton, Virginia

Colleen Hansel, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts

Josh Kohut, Rutgers University, New Brunswick, New Jersey

Anticipated Core Partner Organizations: Hampton University, Rutgers University, University of Massachusetts-Boston, Woods Holes Oceanographic Institution

Proposed Vision: To create a marine innovation ecosystem that improves ocean health, strengthens commercial fisheries, accelerates a just energy transition, and builds a broader new blue economy. These innovations are in many fields including ocean science, materials, bluetech, engineering, economics, policy, and data-driven frameworks. The ecosystem includes those from the marine conservation, commercial fishers, energy, policy, research, academic, coastal, disadvantaged, and tribal communities.

Region of Service (RoS): The Region of Service extends along the Mid-to-North Atlantic coastal region where more than \$100 billion of investment is expected to construct offshore wind energy farms in the next decade, and where there are highly prosperous yet threatened fishing communities. The economic development opportunities would be focused on Justine 40 census tract zones across this region. The ocean corridor provides the super-highway that connects industry, states, stakeholders, and others.

Regional, National, Societal, and/or Geostrategic Challenges: Our oceans are under great stress due to effects of climate change and unsustainable use practices. The livelihood of the commercial fishers is threatened due to depleting and moving fishing stocks, the perceived environmental and operational impact of offshore wind farms (most viable resource for the green energy transition in the Mid-to-North Atlantic) is a barrier to their acceptability. Key technologies to be advanced include marine materials, sensors, ocean technology, data analytics, heavy marine services, construction, fishing, and aquaculture.

Goal of the Proposed Engine: To create a data-driven innovation ecosystem that: greatly improves ocean health, biodiversity, and resiliency; supports more sustainable and prosperous fisheries; enables the design and operation of offshore wind farms that improve the marine environment; and builds a strong new blue economy that focuses benefits on disadvantaged communities.

Potential for High-Impact Outcomes: If the underwater infrastructure of offshore wind farms can be designed to function as effective artificial reefs, then large-scale development will be welcomed (analogous to reforestation on land); this will enable the Engines RoS to meet their climate goals. In the Mid-to-North Atlantic alone, this direct investment to build these offshore wind farms would exceed \$1 trillion. The advances in science, marine materials, engineering, models, technologies, policies, etc., needed to achieve this will provide enormous cross-over benefits in driving a broader new-blue economy.

Region of Service: Fairfield, CT; Middlesex, CT; New Haven, CT; New London, CT; Cumberland, ME; Hancock, ME; Knox, ME; Lincoln, ME; Sagadahoc, ME; Washington, ME; York, ME; Barnstable, MA; Bristol, MA; Essex, MA; Middlesex, MA; Norfolk, MA; Plymouth, MA; Suffolk, MA; Rockingham, NH; Atlantic, NJ; Bergen, NJ; Burlington, NJ; Cape May, NJ; Essex, NJ; Hudson, NJ; Middlesex, NJ; Monmouth, NJ; Ocean, NJ; Union, NJ; Bronx, NY; Kings, NY; Nassau, NY; New York, NY; Richmond, NY; Suffolk, NY; Queens, NY; Westchester, NY; Bristol, RI; Kent, RI; Newport, RI; Providence, RI; Washington, RI; Accomack, VA; Chesapeake City, VA; Gloucester, VA; Hampton City, VA; Lancaster, VA; Mathews, VA; Middlesex, VA; Northfolk City, VA; Northhampton, VA; Northumberland, VA; Portsmouth City, VA; Suffolk, VA; Virginia Beach City, VA; York, VA;

Overarching Challenge: A Just Energy Transition for Oceans and Communities

Keywords: Energy Technology, Advanced Materials, Advanced Manufacturing, Biotechnology

Industry Sectors: 2211 (Electric Power Generation, Transmission and Distribution), 1141 (Fishing), 3345 (Navigational, Measuring, Electromedical, and Control Instruments Manufacturing),

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