WIND RESOURCE ASSESSMENT USING THE NUMERICAL WEATHER PREDICTION MODEL TO IDENTIFY THE OFFSHORE WIND RESOURCE IN THE PHILIPPINES

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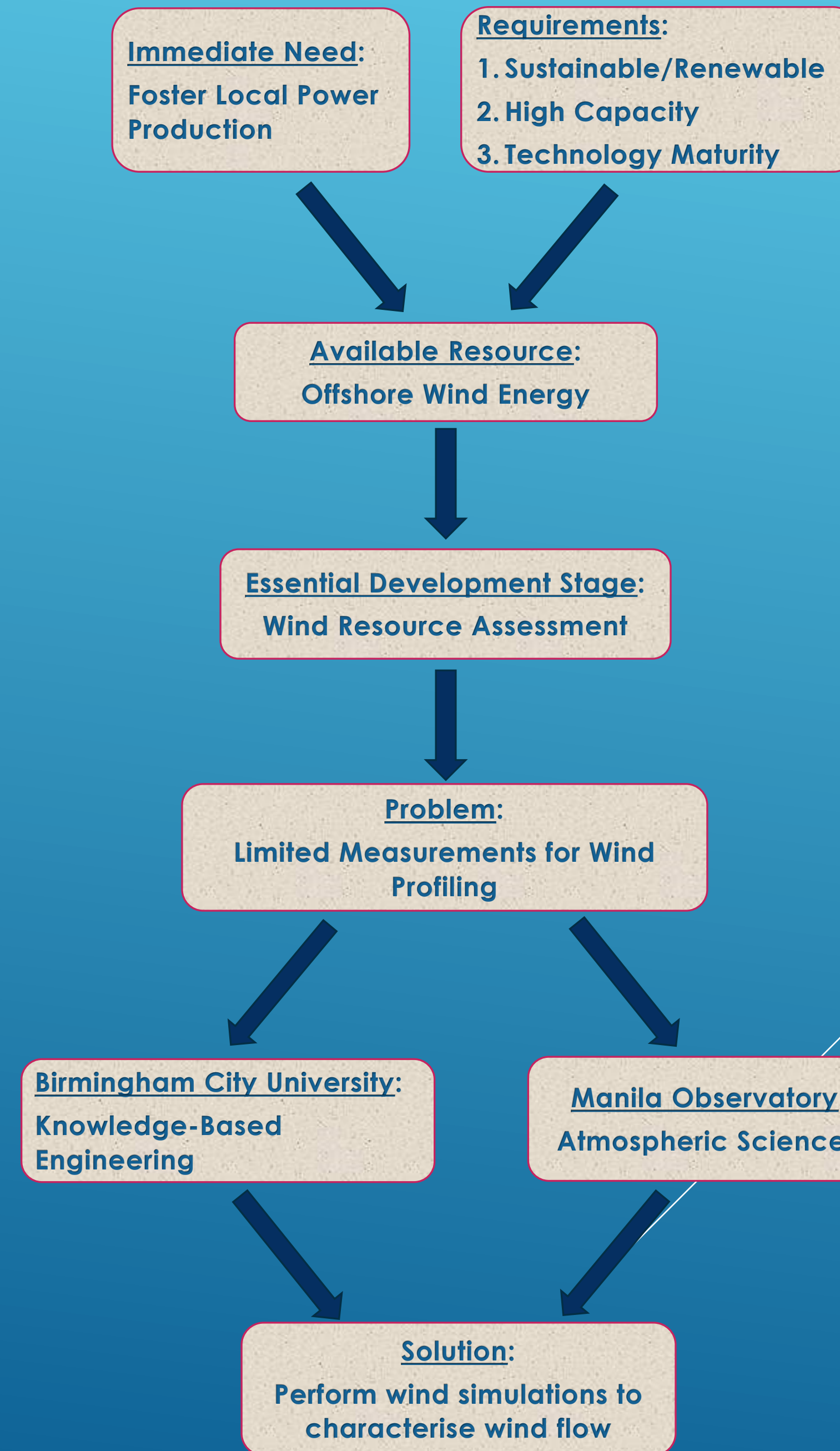**BIRMINGHAM CITY University**

Background

Developing nations need to build their economies in order to reach the millennium goals of the world. Energy is an essential resource for economic development but the conventional fuel at present is not a sustainable energy source. Thus, these countries must seek for renewable energy sources so that they can develop in a sustainable manner. Wind energy is found to be a potential source for power generation especially, the offshore locations as demonstrated by the U.K. through its extensive investment on offshore wind farms. This study aims to develop a wind characterisation method that can be useful for coastal and small island areas with no or few in-situ wind observations. The study area is focused on Palawan Province of the Philippines and the research found that numerical weather prediction is an alternative for in-situ wind measurements for wind resource assessment (WRA). A technique that involves coupling mesoscale model to microscale model is employed in this work in order to produce wind maps through the collaborative effort of Birmingham City University and Manila Observatory.

Study Area and Model Validation Points

Source: http://maps.google.com

Onshore:

Offshore:

Fig. 1: (I) Location of Palawan Island in the Philippine Archipelago. (II) Weather stations operated by the Philippine Atmospherics, Geophysical, and Astronomical Services Administration (PAGASA) (III) Observation points of the 7 Southeast Asian Studies (7SEAS) aerosol research

Research Illustration

Immediate Need: Foster Local Power Production

Requirements:
1. Sustainable/Renewable
2. High Capacity
3. Technology Maturity

Available Resource: Offshore Wind Energy

Essential Development Stage: Wind Resource Assessment

Problem: Limited Measurements for Wind Profiling

Birmingham City University: Knowledge-Based Engineering

Manila Observatory: Atmospheric Science

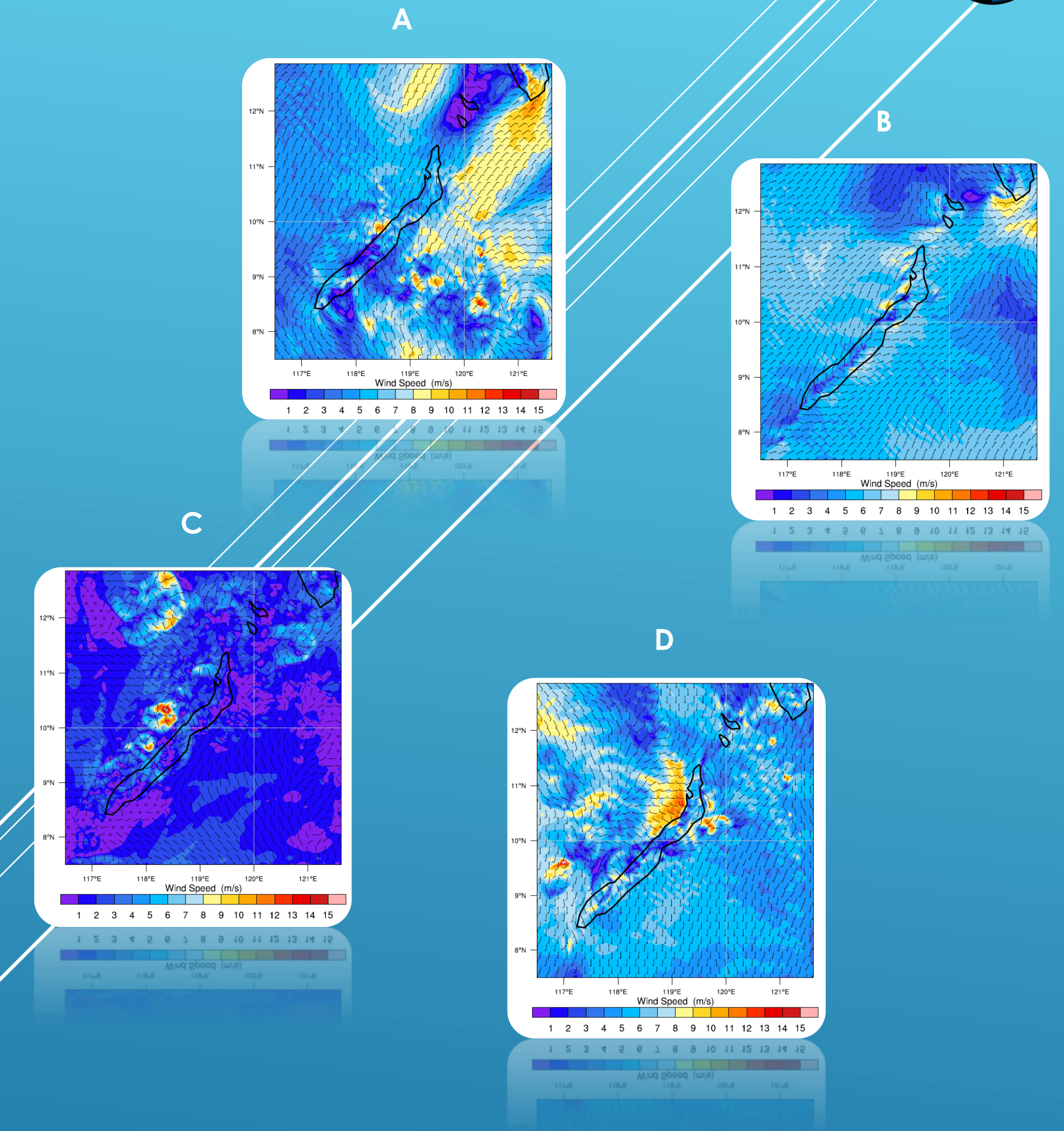**Solution:** Perform wind simulations to characterise wind flow

Wind Maps

Fig. 2: Average winds over Palawan Island at 80m level in 2011 and 2012 for the months of (A) January, (B) April, (C) June, and (D) September. These maps show the locations where offshore wind farm projects may be developed around the island.

Summary

A wind resource assessment method appropriate for the Philippines has been developed through the research partnership between Birmingham City University and the Manila Observatory using numerical weather prediction model.