

## **ABSTRACT**

Wind energy was the fastest growing form of renewable energy in the world during the last decade and forecasts predict that this trend will continue. In the U.S., Renewable Portfolio Standards (RPS) and federal tax incentives drive this trend from a policy perspective, but despite its potential to reduce CO<sub>2</sub> emissions and dependence on foreign fuel for electricity generation, wind energy development remains a contentious issue and siting of wind power systems remains problematic. This thesis presents a GIS-based tool for preliminary site suitability analysis for Onshore Wind Power Systems (ONSWPS) that can be used to address these issues from a planning perspective. This tool incorporates Multi-Criteria Analysis (MCA) and the Analytical Hierarchy Process (AHP) along with various forms of spatial and sensitivity analysis to provide quick visual access to ONSWPS site selection information through a series of suitability maps.