What types of states adopt Renewable Portfolio Standards to promote wind energy?

Introduction

Renewable Energy is a contentious issue in the United States. Unreliable, rarely price-competitive with fossil fuels, and inflexible, renewable energy sources often require policies to encourage their deployment. Given the lack of a significant and coherent national policy on renewables, their promotion is in the hands of state government, leading to a significant variation in the success of states in promoting renewable energy. Controversy around renewable abounds, as members of local communities take a Not-In-My-BackYard (NIMBY) approach to the development of renewable energy resources, and the association with the unfortunately partisan issue of climate change, can lead to far from optimal deployment of technologies for harvesting renewable energy resources.

Several states have adopted a policy known as a Renewable Portfolio Standard (RPS), which mandates that utilities purchase a certain percentage of their electric power from renewable sources. These maps examine the wind resources, political leanings, and the population's proximity to wind turbines to generate a profile of the type of state that adopts an RPS.

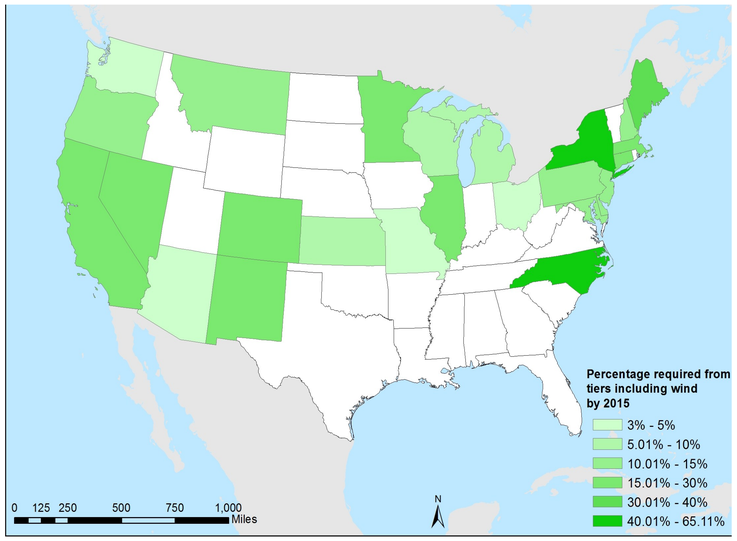
Thus, the questions asked include:

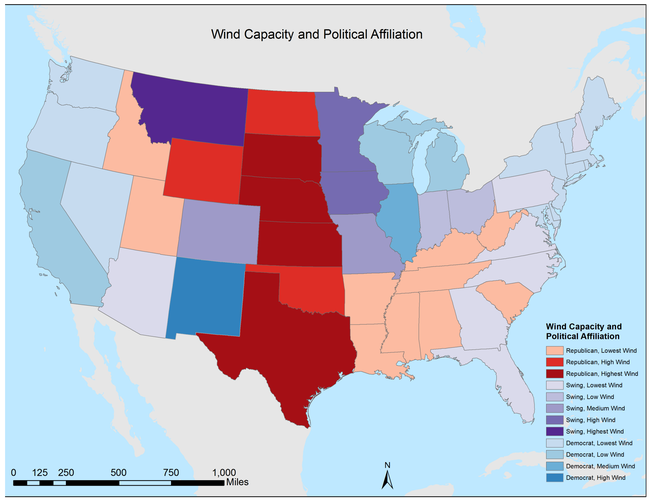
Resources-Policy: Have plentiful wind energy resources generally led to strong wind promotion strategies (Renewable Portfolio Standard – RPS)?

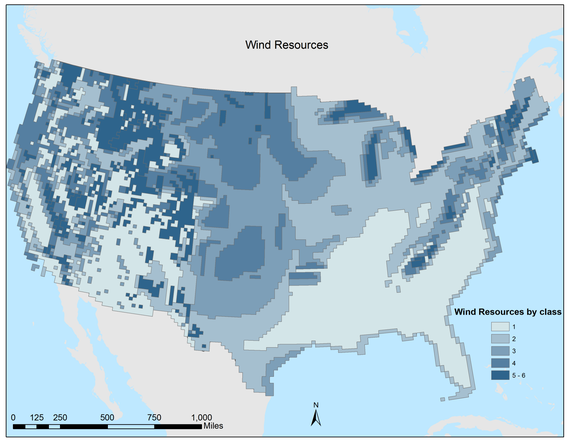
Politics-Policy: How does the dominance of one political party affect the adoption of an RPS? Are political or regional differences more important?

Proximity-Policy: How does the population's proximity to wind resources and/or wind turbines affect the adoption of an RPS? Studies have been done to examine how being close to a turbine changes their opinion of renewable energy, but not how that translates into policy.

Level of RPS







Methodology

Data on state RPS is available from the Department of Energy's DSIRE database (Database of State Incentives for Renewable Energy). The data is divided into "tiers" which are tranches which can only be fulfilled by certain technologies. I aggregated by state all of the tiers which permit the use of wind energy to fulfill the quota.

To compare the wind energy resources, I used a low resolution raster data set from the Department of Energy for wind energy at 80 meters. The DOE divides these into classes, of average wind speed. A class of three or above is generally considered suitable for the development of wind energy.

Since the level of opportunity for renewable energy deployment varies by state, I compared states based on their actions in terms of RPS with respect to their available resources based on a database of percentage of suitable land available for wind energy development from the National Renewable Energy Laboratory. I did this by normalizing the RPS by the available land. The resulting score provides a basis for comparison states as far as how "aggressive" their RPS targets are.

To determine the percentage of the population that is close to wind turbines, I used data from the Oak Ridge National Laboratory on the location of wind turbines throughout the United States. I selected the block centroids in the United States Census within five miles of one of the turbines, and performed a spatial join to divide these into their respective U.S. states. I then summarized the information by state, joined it to the state census data, and normalized it by the population, generating a map of the percentage of the population living within 5 miles of a wind turbine.

Finally, to analyze political affiliation in conjunction with wind resources, I reclassified Political Affiliation into Republican (2008 Presidential election vote 55%+ Republican), Swing (vote split 45-55 or closer), or Democrat (55%+ Democrat). I then reclassified the wind capacity of the states, and combined them to create categories (Republican-High wind, Swing-Low Wind, etc.)

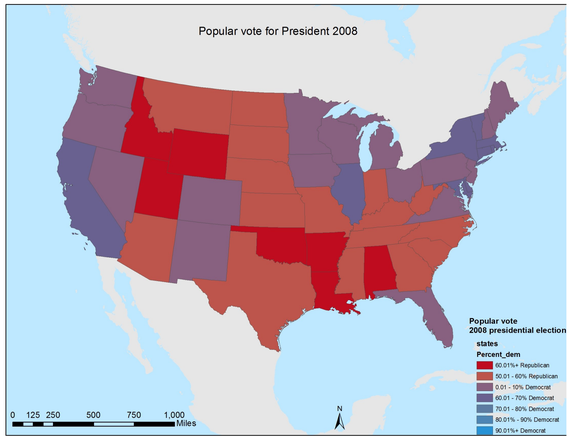
Conclusions

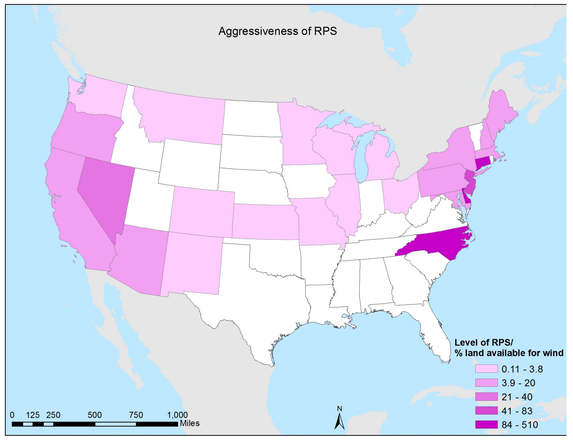
States that adopt an RPS do not necessarily have significant wind resources. While the Midwest is home to some of the most significant wind available wind resources in the country, very few of the states in the Midwest have adopted RPS. This does not mean, however, that these states are not promoting the use of wind energy. As can be seen from the location of the wind turbines, this lack of RPS has not necessarily prevented the deployment of wind energy. Texas, which has no RPS, is the largest generator of electricity from wind in the United States.

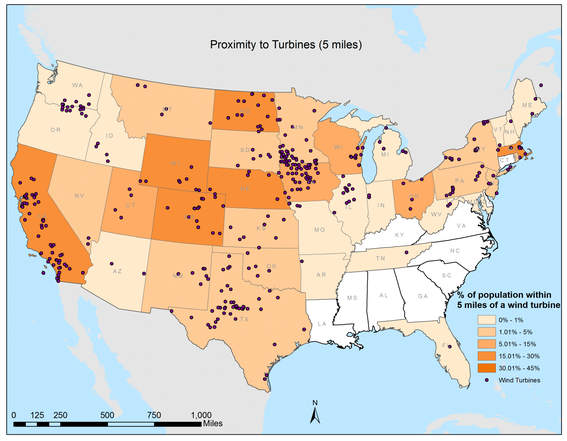
A strong Democratic presence appears to be more of a factor in the adoption of a wind RPS. Of the states which have an RPS for wind, only four—Arizona, Wyoming, Missouri, and Kansas—voted for John McCain in 2008. On the other side, there are only three states which voted for Obama in 2008 have no RPS for Wind —Iowa, Vermont, and Florida. Vermont has a voluntary recommendation in place of 20% by 2017. While Florida has no RPS, this may be a function of the general lack of wind energy resources throughout much of the South.

Taking into consideration the amount of resources available, the most ambitious states are found in the West and the Northeast, with a North Carolina providing a surprising exception, as a state with a significant RPS in spite of a lack of wind energy resources.

In some of the states with significant RPS, much of the population lives close to wind turbines, whereas in others it does not. This does not give any complete picture of the effect of proximity on the adoption of an RPS.







Cartography: Paolo Cozzi

Projected Coordinate System: Albers Equal Area Conic

Sources: Department of Energy (2012),
Oak Ridge National Laboratory (2010),
US Census (2000)

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