

Do Renewable Portfolio Standards Explain the U.S. States' Development of Wind Energy?

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Introduction

Wind energy has the largest share in the nation's electricity generation mix. With a few exceptions, the national government has not set substantial policies that advance wind energy. However, twenty-nine states have adopted renewable portfolio standards (RPS), that limit carbon emissions by a certain deadline. For example, Minnesota's RPS is 26.5% renewable by the year 2025. This policy has become quite popular among the states, but does it work?

Literature

- Delmas, M. A., & Montes-Sancho, M. J. (2011). U.S. state policies for renewable energy: Context and effectiveness.
- Joshi, J. (2021). Do renewable portfolio standards increase renewable energy capacity?
- Maguire, K. (2016). What's powering wind? The effect of the U.S. state renewable energy policies on wind capacity
- *Electricity Data Browser*. (n.d.). <https://www.eia.gov/electricity/data/browser>

Hypothesis and Analysis

Hypothesis 1: In comparison of the states, there will be a greater share of wind generation for those having an RPS, than those without an RPS.

Table 1: IPP Net Generation from Wind (MW) 2021 Sorted by the Presence of RPS

		Does this state have a RPS?			
		No	Yes		Total
IPP Net Generation from wind (MW) 2021	Low	Count	8	9	17
		Percent	40.0%	31.0%	34.7%
	Middle	Count	6	11	17
		Percent	30.0%	37.9%	34.7%
High	Count	6	9	15	
	Percent	30.0%	31.0%	30.6%	
Total	Count	20	29	49	
	Percent	100.0%	100.0%	100.0%	

Chi Square = .493
Phi = .100, Cramer's V= .100
*Significant at .05, **Significant at .01

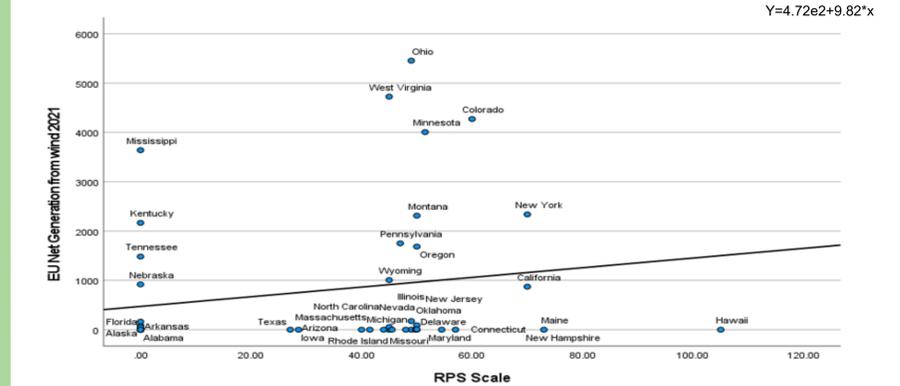
Table 2: EU Net Generation from Wind (MW) 2021 Sorted by the Presence of RPS

		Does this state have a RPS?			
		No	Yes		Total
EU Net Generation from Wind (MW) 2021	Low	Count	10	16	26
		Percent	50.0%	55.2%	53.1%
Middle	Count	3	5	8	
	Percent	15.0%	17.2%	16.3%	
High	Count	7	8	15	
	Percent	35.0%	27.6%	30.6%	
Total	Count	20	29	49	
	Percent	100.0%	100.0%	100.0%	

Chi Square = .309
Phi = .079, Cramer's V= .057
*Significant at .05, **Significant at .01

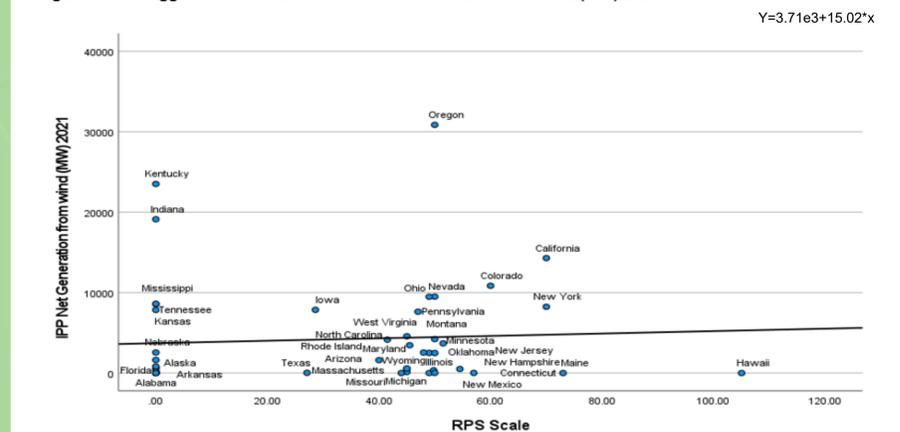
Hypothesis 2: In comparison of the states, there will be a greater share of wind generation for those having aggressive RPS, than those with relaxed RPS.

Figure 2: RPS Aggression in Relation to EU Net Generation from Wind (MW) 2021



Pearson's R = .189
*Significant at .05, **Significant at .01

Figure 1: RPS Aggression in Relation to IPP Net Generation from Wind (MW) 2021



Results and Implications

The results reject the first hypothesis. States with high generation are more likely to have no set RPS. However, states with moderate wind generation are slightly more likely to have an RPS. This policy cannot be viewed as the ultimate solution to advance wind energy development among the states.

The results offer weak support for the second hypothesis. The regression coefficient is 0.004. This means that every 1-point increase in RPS aggression there is a 15.02 (MW) increase in wind generation. States need to enhance their RPS so that it can properly incentivize electricity providers to expand wind generation.



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