

Executive Summary

Scrapping a Wind Turbine: Policy changes, scrapping incentives and why wind turbines in good locations get scrapped first

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Previous studies have shown that only a minority of wind turbines get scrapped because of mechanical defect or wear. In this way, wind turbines are more like computers than cars – turbines are usually scrapped in order to make room for newer, larger, more technologically advanced models. The lifetime of a turbine is then not primarily a function of mechanical quality but is dependent on a combination of technological change, subsidy policy and the wind resources of a turbine's location. The research has implications for the designing and implementation of wind power subsidies.

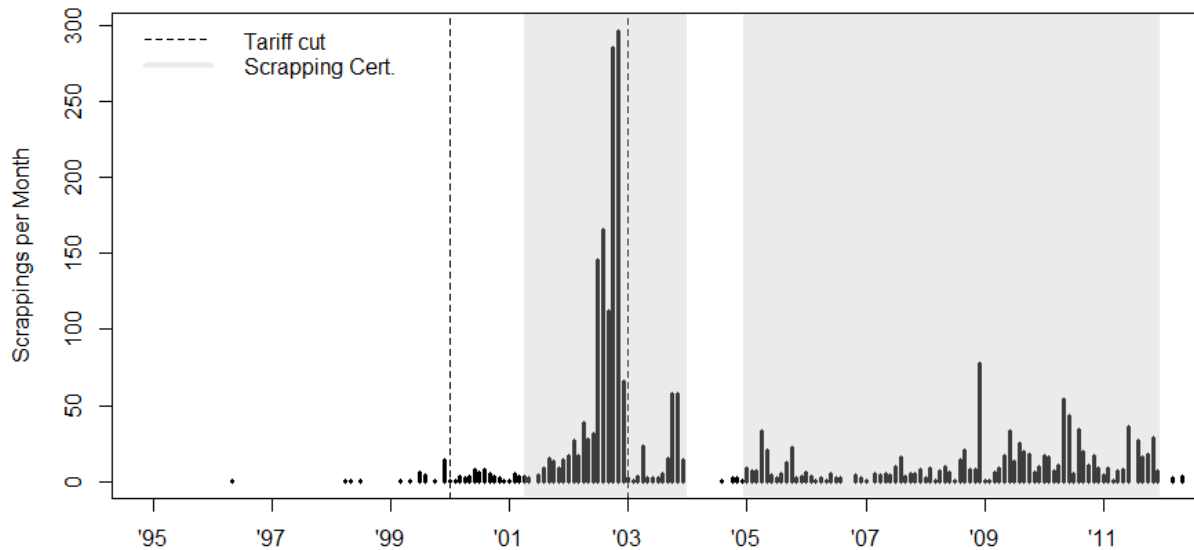
A data set consisting of all wind turbines constructed in Denmark from 1972 through July of 2012 is used in the study. I show that the timing of scrapping is strongly affected by changes in

wind power subsidy policy as well as by policies meant to encourage the scrapping of older turbines. The key finding is that turbines located in better, windier locations get scrapped first.

Reductions in subsidy cause scrappings

Reductions in wind power subsidies have led to jumps in the number of scrappings as the figure below shows. The reason is that turbine owners receive subsidies for a defined lifetime of their turbine based on when they were installed. When a reduction in subsidies was announced, owners rushed to install new, larger turbines before the lower subsidy policy took effect. Because zoning and preparing new land for turbines take time, many wind power producers instead scrapped older turbines to make room for the newer turbines.

In the figure the dotted vertical lines represent times when subsidies were lowered and the jumps in scrappings are visible before the policy changes at the beginning of 2000 and especially 2003. The shaded region shows periods in which a subsidy was available for owners who scrapped older, smaller turbines. These policies are also shown to have been highly effective.



Turbines in good locations get scrapped first

The main result of the research is to show that as turbine owners rushed to install new turbines before the production subsidy was lowered or to take advantage of the scrapping subsidy, they tended to scrap turbines located in better, windier locations first. This is because in the face of technological change that has led to the ability to make larger more productive turbines over time, older turbines located in windier locations represent a higher opportunity cost.

The findings have implications for the designing and timing of wind power subsidies. The research suggests, for example, that if the goal of policy is to maximize the amount of wind power, changes in policy should be announced well in advance so that producers have time to prepare new land for the installation of a new turbine rather than scrapping an old one.

