

Pricing the Risk Associated to Weather of Variable Renewable Energy Generation

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Abstract : We propose a methodology for setting the price of an insurance contract targeted to manage the risk associated with weather conditions that affect variable renewable energy generation. The methodology relies on conditional quantile regressions to estimate the weather risk of a solar panel. It is illustrated using real daily radiation and weather data for three cities in Spain (Valencia, Barcelona and Madrid) from February 2/2004 to January 22/2019. We also adapt the concepts of value at risk and expected short fall from finance to this context, to provide a complete panorama of what we label as weather risk. The methodology is easy to implement and can be used by insurance companies to price a contract with the aforementioned characteristics when data about similar projects and accurate cash flow projections are lacking. Our methodology assigns a higher price to an insurance product with the stated characteristics in Madrid, compared to Valencia and Barcelona. This is consistent with Madrid showing the largest interquartile range of operational deficits and it is unrelated to the average value deficit, which illustrates the importance of our proposal.

Keywords : insurance, weather, vre, risk

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