



## **Trend of wind energy over the continental United States**

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Trend of wind energy at the 80 m hub height over the continental United States is investigated using 31 years of North American Regional Reanalysis (NARR) data. This study takes advantage of the fine resolution (25 mb or ~200 m) of NARR data in the boundary layer to estimate the wind speed at 80 m. Based upon the wind speeds at two layers right below and above the 80 m, the wind speeds at 80 m are estimated using two methods assuming the wind profile respectively as linear and power-law distribution with respect to the altitude. The variation of air density with topography is taken into account in the calculation of wind energy. Monthly-averaged wind energy is calculated with two methods: (a) average the wind speed first to get monthly mean wind speed, and then compute the wind energy; (b) compute the wind energy four times a day, and then average them to obtain monthly mean wind energy. The statistical analysis of the trend of wind energy is then conducted for four datasets generated respectively through different combination of interpolation method (linear or power-law) and averaging method (a or b). In contrast to the several early studies showing the declining trend of wind energy over various ground-based stations, our preliminary analysis shows a general increase of wind energy in many regions of the continental United States.