

# Accepted Manuscript

Temporally-explicit and spatially-resolved global onshore wind energy potentials

Jonathan Bosch, Iain Staffell, Adam D. Hawkes

PII: S0360-5442(17)30809-5

DOI: [10.1016/j.energy.2017.05.052](https://doi.org/10.1016/j.energy.2017.05.052)

Reference: EGY 10859

To appear in: *Energy*

Received Date: 10 January 2017

Revised Date: 7 April 2017

Accepted Date: 9 May 2017

Please cite this article as: Bosch J, Staffell I, Hawkes AD, Temporally-explicit and spatially-resolved global onshore wind energy potentials, *Energy* (2017), doi: 10.1016/j.energy.2017.05.052.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



## Energy: The International Journal

2 Temporally-explicit and spatially-resolved global onshore wind  
energy potentials4 Jonathan Bosch<sup>a\*</sup>, Iain Staffell<sup>b</sup>, Adam D. Hawkes<sup>a</sup>6 <sup>a</sup> Department of Chemical Engineering, Imperial College London, SW7 2AZ, UK<sup>b</sup> Centre for Environmental Policy, Imperial College London, SW7 1NA, UK

---

8 **Abstract**

Several influential energy systems models indicate that renewable energy must provide a significant share of the world's electricity to limit global temperature rises to below 2°C this century. To better represent the costs and other implications of this shift, it is important that these models realistically characterise the technical and economic potential of renewable energy technologies. Towards this goal, this paper presents the first temporally-explicit Geospatial Information System (GIS) methodology to characterise the global onshore wind energy potential with respect to topographical features, land use and environmental constraints. The approach combines the hourly NASA MERRA-2 global wind speed data set with the spatially-resolved DTU Global Wind Atlas. This yields high resolution global capacity factors for onshore wind, binned into seasonal and diurnal time-slices to capture the important temporal variability. For each country, the wind power generation capacity available for various capacity factor ranges is produced, and made freely available to the community. This data set can be used to assess the economically viable wind energy potential on a global or per-country basis, and as an input to various energy systems models.

22 Keywords: wind power, technical potential, Global, Geospatial, renewable energy, energy systems model

---

---

\* Corresponding author: j.bosch14@imperial.ac.uk

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات