Simulation of transcontinental wind and solar PV generation time series

The deployment of Renewable Energy Sources (RES) is driving modern power systems towards a fundamental green transition. In this regard, there is a need to develop models to accurately capture the variability of wind and solar photovoltaic (PV) power, at different geographical and temporal scales. This paper presents a general methodology based on meteorological reanalysis techniques allowing to simulate aggregated RES time series over large geographical areas. It also introduces a novel PV conversion approach based on aggregated power curves in order to capture the uncertainty associated to the technical characteristics of individual installations spread across large regions. The proposed methodology is validated using actual power data in Europe and can be applied to represent intermittent generation in network development plans, reliability and market studies, as well as operational guidelines.

General information
State: Published
Organisations: Department of Wind Energy, Integration & Planning, Resource Assessment Modelling, Meteorology & Remote Sensing
Pages: 425-436
Publication date: 2018
Peer-reviewed: Yes

Publication information
Journal: Renewable Energy
Volume: 118
ISSN (Print): 0960-1481
Ratings:
BFI (2019): BFI-level 1
Web of Science (2019): Indexed yes
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 5.38 SJR 1.847 SNIP 2.008
Web of Science (2017): Impact factor 4.9
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 4.83 SJR 1.661 SNIP 2.05
Web of Science (2016): Impact factor 4.357
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 4.51 SJR 1.767 SNIP 2.085
Web of Science (2015): Impact factor 3.404
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 4.51 SJR 1.925 SNIP 2.621
Web of Science (2014): Impact factor 3.476
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 4.63 SJR 1.989 SNIP 2.719
Web of Science (2013): Impact factor 3.361
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 3.97 SJR 1.787 SNIP 2.699
Web of Science (2012): Impact factor 2.989
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1