APS March Meeting 2016

Monday–Friday, March 14–18, 2016; Baltimore, Maryland

« » ‖ ▶

Session X53: Electricity and Hydrogen Production, Storage and Delivery

8:00 AM–11:00 AM, Friday, March 18, 2016
Hilton Baltimore Room: Holiday Ballroom 4

Sponsoring Unit: FIAP
Chair: Ernesto Marinero, Purdue University

Abstract: X53.00012 : Anticipated detection of favorable periods for wind energy production by means of information theory
10:36 AM–10:48 AM

Preview Abstract   *MathJax **On** | Off* ← Abstract →

Authors:
  Eugenio Vogel
    (Universidad de La Frontera, Temuco, Chile)

  Gonzalo Saravia
    (Universidad de La Frontera, Temuco, Chile)

  Sigismund Kobe
    (Technische Universität Dresden, Dresden, Germany)

  Rolf Schumann
    (Technische Universität Dresden, Dresden, Germany)

  Rolf Schuster
    (Driedorf, Germany)

Managing the electric power produced by different sources requires mixing the different response times they present. Thus, for instance, coal burning presents large time lags until operational conditions are reached while hydroelectric generation can react in a matter of some seconds or few minutes to reach the desired productivity. Wind energy production (WEP) can be instantaneously fed to the network to save fuels with low thermal inertia (gas burning for instance), but this source presents sudden variations within few hours. We report here for the first time a method based on information theory to handle WEP. This method has been successful in detecting dynamical changes in magnetic transitions [J. Mag. Mag. Mater. 372 (2014) 173] and variations of stock markets [Eur. Phys. J. B 87 (2014) 177]. An algorithm called wlzip based on information recognition is used to recognize the information content of a time series. We make use of publically available energy data in Germany to simulate real applications. After a calibration process the system can recognize directly on the WEP data the onset of favorable periods of a desired strength. Optimization can lead to a few hours of anticipation which is enough to control the mixture of WEP with other energy sources, thus saving fuels.