The Variability and Intermittency of Wind and Solar Power Can Be Overcome Without Storage By Using the National Energy With Weather System (NEWS) Simulator To Design A National US Electric Sector



C T M Clack, A E MacDonald, P D Picciano, J Paine, L M Terry and M Marquis Tuesday 12th 2016, AMS 7Energy, New Orleans, LA





-- Please consider our other presentations --

396 Leigh Terry – Poster Session Monday

429 Julia Paine – Poster Session Monday

TJ13.6 Paul Picciano – 14:45 Today, Room 245

J6.4A Leigh Terry (Chris Clack) – 09:15 Thursday, Room 355

Weather is Critical in the Assessment of Weather-Driven Renewable Energy

Wind Capacity Factors at 90m



- Utilizes RUC, RAP, HRRR & FIM

- Power estimates take into account: icing, snow cover, REWS, turbulence, downtimes, and more.

- A decade at 13-km (2006-2015)
- Three years at 3-km (2012-2015)
- Three years overlap 3-km and 13-km different model physics.

Solar PV Capacity Factors



The Electric Power System in 2012



The Electric Power System by 2018



Cost optimized US Electric Power System for 2030 (Geographic Scaling Nodes)



Cost optimized US Electric Power System for 2030



HVDC Transmission Overlay



Electric Losses and Integration Costs are modeled within each State



Cost optimized US Electric Power System for 2030





Wind Placements are "pushed" to the edge of the domain (why?)





Variability for National Minimum Standard





Variability for National Minimum Standard



Duration Curve for National Minimum Standard



Each State benefits differently – 44 of the 48 States have new wind or solar PV deployed



* More of this information in the talk on Thursday!

Questions?

Photo by Will von Dauster, 2015