

Nebraska Statewide Wind Integration Study PROJECT SUMMARY

***Note** – This document is NOT a news release. Any news release on this study project needs to be reviewed and approved by Neil Wikstrom of NREL and Clint Johannes of NPA. For further project information, please contact Clint Johannes, Assistant General Manager, Nebraska Electric G&T Cooperative, Inc., and Chair of the NPA Joint Planning Subcommittee, 402-910-1856 (cell), 402-564-8142 (office), cjohannes@neb.rr.com (office), csjohannes@intergate.com (home).*

The Nebraska Power Association (NPA, www.nepower.org) entered into an agreement on October 23, 2008, with the National Renewable Energy Laboratory (NREL, www.nrel.gov) to perform a year-long Nebraska Statewide Wind Integration Study. This is an outcome of NREL's Request for Proposal (RFP) RAM-8-89030. Federal funding of \$500,000 for this study is matched by an equal contribution of cash and in-kind labor to be provided by the participating NPA utilities.

NREL is a national laboratory of the U.S. Department of Energy (DOE), Office of Energy Efficiency and Renewable Energy, and is operated by the Alliance for Sustainable Energy, LLC. As such, DOE and NREL have an interest in advancing the understanding of wind integration impacts in the Western Area Power Administration's (WAPA) service area and among consumer-owned electric power cooperatives.

The integration study objectives of NREL and the NPA include applying the best study practices for the assessment of wind's impact in the different time scales from immediate to longer time frames (i.e., regulation, load following, and unit commitment/scheduling) using high-quality wind speed and/or wind power data. The study will be using detailed and voluminous wind-speed calculations already made by NREL for many specific locations across the state of Nebraska.

NREL has also converted these turbine-height wind speed calculations into typical wind generator outputs on a 10-minute frequency for years 2004-2006. These detailed wind data will be matched to historical NPA system load profiles also represented on the same timing and frequency. The two primary study models will involve (1) statistical analysis of this time and load data to develop certain inputs for the (2) production model that includes complete electrical generation and transmission representation for the power system in Nebraska and several surrounding states to the north, south, and east.

Two well-qualified consulting firms have been contracted by the NPA for technical and project management support. EnerNex Corporation (www.enernex.com) is responsible for consultant project management and statistical analysis. Ventyx Energy, LLC, (www1.ventyx.com/advisory/strategic-consulting.asp) is responsible for generation and transmission system modeling.



Stakeholder and expert technical input will be obtained through a Technical Review Committee scheduled to meet six times throughout the study. The Committee first met on October 29 and consists of representatives for NREL, the NPA utilities, the consultants, Utility Wind Integration Group, Western Area Power Administration, Southwest Power Pool, University of Nebraska, Nebraska Department of Energy and Energy Office, Nebraska Wind Working Group, Nebraska Power Review Board, American Wind Energy Association, and invitations have been given to two area Native American tribal organizations.

Key points that describe the study approach and scope include:

1. Modeling the power system ten years into the future and making several distinct computer runs for the major uncertainties of:
 - a. Wind regime variability (as varying between the three historical years)
 - b. Wind generation penetrations from moderate to high (a range at least from 10% to 20% on an energy basis),
 - c. Level of forecasting error on wind generation,
 - d. Emission regulatory conditions (especially for carbon dioxide impacts), and
 - e. Size of system operational configurations (statewide vs. regional balancing).
2. Special evaluations will focus on:
 - a. Potential capability of the WAPA hydro system to provide operational value for supporting wind generation,
 - b. Capacity value of wind generation,
 - c. Hydro-pumped storage value in supporting wind generation,
 - d. Capability of existing and future generation additions as well as power market participation in supporting wind operations, and
 - e. Other yet-to-be-identified planning solutions that may contribute to integrating wind generation into the Nebraska power system.

The study results will be available for public distribution as documents and in the form of verbal presentations made at local and national conferences. Although many operational, non-cost parameters will be studied, a key result will be total \$/MWh of wind generation for the cost borne by the rest of the power system to make up for the wind generation's characteristics of variability and uncertainty.

The Nebraska Power Association is a voluntary organization formed in 1980 to address common interests and concerns of Nebraska's publicly owned electric utility industry. The NPA's members represent municipalities, public power districts, public power and irrigation districts, and cooperatives engaged in the generation, transmission, and distribution of electric energy in Nebraska. More information about the NPA can be found at www.nepower.org.

