WAPA System Impact Study
Plan For Next Semester

by
Pamela Ackerman
Jonathan Fidrych
Joshua Restad
Christine Schraeder

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Department of Electrical and Computer Engineering
Colorado State University
Fort Collins, Colorado 80523
Colorado State University announced, in March of 2007, plans to power the entire Fort Collins campus with 100 percent wind power. CSU retained the services of Wind Holding LLC to construct a wind farm to achieve this goal. Wind Holding LLC has two years to begin construction and up to eight years to complete the CSU Green Power Project, which would include a minimum of 65 megawatts or about 25 wind turbines with the potential of up to 200 megawatts. At peak demand, CSU currently uses about 16 megawatts of power.

One of the goals of our project was to complete a System Impact Study for CSU’s proposed wind farm. This study is to include an analysis of the grid in the proposed area of the wind farm, a stability analysis to ensure continued health of the grid once the wind farm is in operation. In order to accomplish this goal, we needed to acquire a FORTRAN compiler to run the Dynamics part of the PSS/E simulation and analysis. This will allow us to simulate the wind farm in real time and allow us to perform frequency analysis on our design. We worked with Dan Herrick to purchase the licenses for this compiler, and with ENS to install the compiler on the computer systems in the Lockheed Martin Lab (now called Magellan) in the Engineering Building at CSU. Currently, we have concerns about the compatibility between the compiler and the version of PSS/E that is installed on the school’s computers. This issue will be resolved during the first part of our second semester.

In the meantime, our group has been mapping the proposed area and determining the best connection point between our wind farm and the existing grid. This includes modifying the base case in PSS/E by adding our wind generation unit to the existing case as well as all the necessary busses, transformers capacitor banks and transmission lines. Once this is completed, we can use it to run contingency simulations in PSS/E to establish how robust our installation is or to determine what needs to be added or redesigned to strengthen the addition of the proposed wind farm to the grid. We will be conducting Power Flow and Stability analysis. We are hopeful to have the power flow analysis completed by February 29, 2008 and the stability analysis completed by April 18, 2008. Our study thus far has focused on several points of inter-connection and this brought into consideration cost issues as well as stability issues. Our study has considered tying into an existing coal plant, or tapping into one of two different existing transmission line sections.

The map shows the northern border between Colorado and Wyoming which includes Maxwell Ranch. This is the proposed area for CSU’s wind farm. The balloon at the top indicates our chosen location for the wind farm, and the other two balloons show two of the substations which were under consideration as connection points.