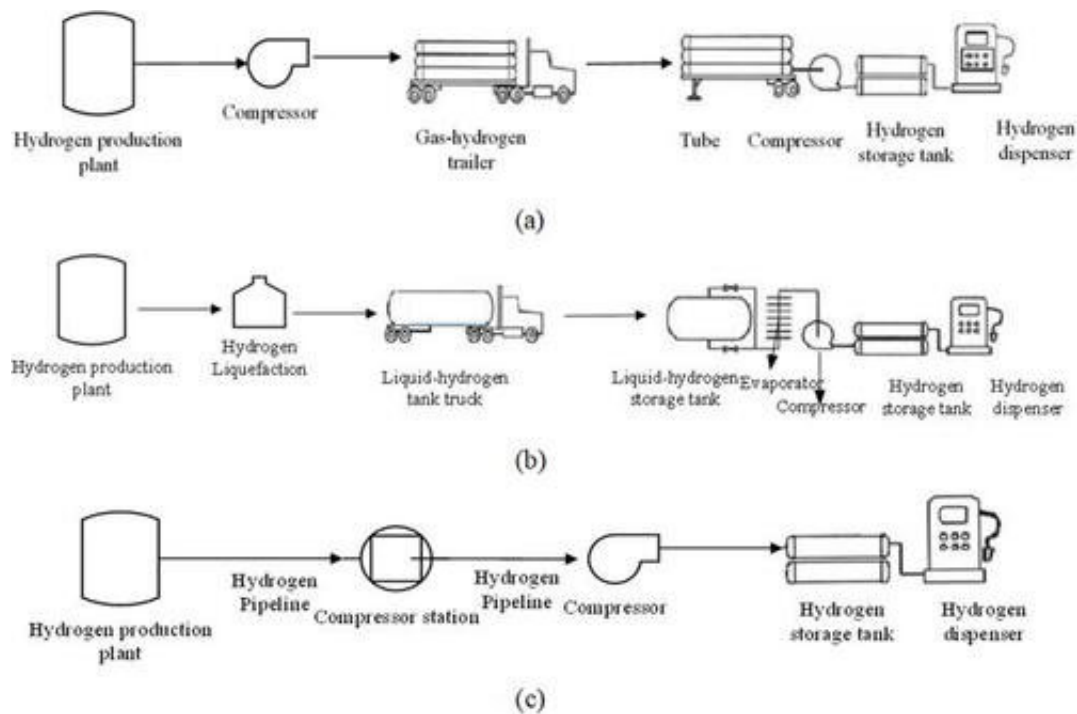


# Researchers use wind farm site field data to test supercomputer modeling

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Specific flow chart of (a) gas-hydrogen, (b) liquid-hydrogen, and (c) pipeline transportation processes. Credit: *Journal of Renewable and Sustainable Energy* (2023). DOI: 10.1063/5.0141098

A collaboration between University of Wyoming researchers and a wind energy company has provided new insights into the use of high-performance computing to predict wind resources.

A team led by Michael Stoellinger, an associate professor in UW's

Department of Mechanical and Energy Systems Engineering and co-director of the Wind Energy Research Center, compared sophisticated computer simulations of wind flow with data recorded at the Power Company of Wyoming's Sierra Madre wind farm site near Rawlins. The research was selected as a featured article in the *Journal of Renewable and Sustainable Energy*.

The researchers concluded that their predictive simulations—conducted on the National Center for Atmospheric Research-Wyoming Supercomputing Center near Cheyenne, as well as on UW's Advanced Research Computing Center—were quite accurate when compared with actual data recordings of [wind speeds](#) and duration at the site near Rawlins. Such modeling helps with the siting of wind energy projects.

The study was a test of a microscale modeling approach called large eddy simulation (LES), which requires extensive use of supercomputers. While the computations for the study took place over a number of days, the researchers say advancements in supercomputing capacity soon will allow the calculations to be done in a matter of hours.

"This, in turn, might make LES a standard tool in the near future for evaluating the detailed wind resource within complex terrain and for wind farm layout design studies," the researchers wrote.

Stoellinger expresses appreciation to the Power Company of Wyoming for sharing the data from its wind energy development site. Also involved in the study were former UW Ph.D. student Yi Han and some of his colleagues from China's wind power company.

**More information:** Miao Li et al, Economic assessment and comparative analysis of hydrogen transportation with various technical processes, *Journal of Renewable and Sustainable Energy* (2023). [DOI: 10.1063/5.0141098](https://doi.org/10.1063/5.0141098)

Provided by University of Wyoming

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