Wind Flow Model of Area Surrounding Case Wind Turbine
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Introduction:
The Case Western Reserve University (CWRU) Wind Turbine, located in Cleveland, Ohio, is one of the few existing urban wind turbines in the country. Its location is at the center of many campus buildings which vary in sizes and shapes. This research attempts to answer the question of whether or not the output of CWRU wind turbine is affected by its surrounding buildings.

Computational Methods:
➢ Gather all existing wind measurement data.
➢ Create CFD of each individual building and test for accuracy.
➢ Analyze compiled CFD model of all buildings w/o wind turbine.
➢ Analyze CFD of wind turbine by itself.
➢ Analyze compiled CFD of all buildings w/ wind turbine.
➢ Compare final results to real wind measurement data.

Application:
➢ Proves that it is reasonable to have a wind turbine in an urban setting.
➢ Shows the maximum height for the buildings in order not to affect the turbine at hub height.
➢ Gives insight on how to create a model in order to test the viability of a urban location for a turbine.

Model Validity:
To test the validity of the model, real wind measurements were documented by cup anemometers at different locations and heights and compared to the model results.

Conclusions:
✓ The model had reasonable agreement with the wind measurements.
✓ The model visually demonstrated the effects of the buildings on the wind profile, thus on the turbine.
✓ For the prevailing wind direction the wind did not have an effect on the turbine at hub height.