

Flatirons Campus at NREL Boulder, Colorado, USA



General description of turbines

Model: GE 1.5-SLE

Tower height: 80 m

Rotor diameter: 77 m

U.S. Department of Energy owned; used for research and development

Commissioned in September 2009

Model: SWT-2.3-108

Tower height: 80 m

Rotor diameter: 108 m

Siemens owned and operated

Multiyear cost-shared R&D cooperative research and development agreement for aerodynamics and rotor performance

101-m turbine commissioned in October 2009; rotor changed to 108 m in November 2013

Model: G97-2.0MW

Tower height: 90 m

Rotor diameter: 97 m

Gamesa owned and operated

Multiyear partnership agreement for testing and R&D

Class III turbine commissioned in November 2011; removed and replaced with G97

Class II machine commissioned in March 2013

CART 600-kW Turbine

Model: Westinghouse

Blades: 2

Downwind – highly coned rotor
 Hub height: 36.6 m
 Rotor diameter: 42.6 m
 Extensively instrumented

Location of NREL wind turbines

The test facility is located in Boulder, Colorado.

The coordinates are: 39.915104582282915, -105.21320128378841

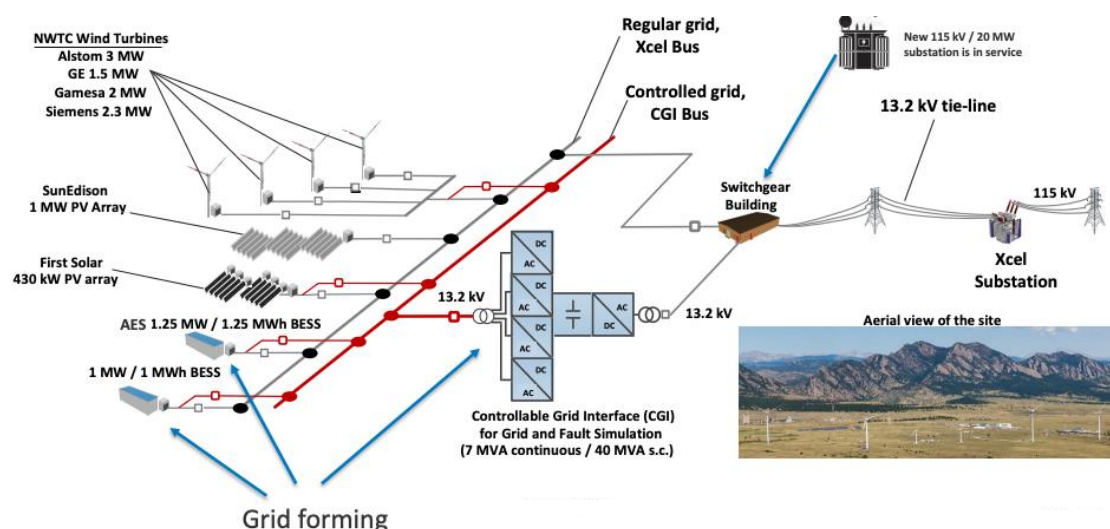
Control and measurements equipment at NREL

- Two 135-m and two 80-m met towers
- Research-grade inflow measurements at multiple heights
- Reference for ground-based lidar and sodar comparison
- Characterize atmospheric conditions that affect turbine responses, support atmospheric science R&D
- Record the wind speed (sonic and cup anemometers), direction, temperature, humidity, and pressure used to derive wind shear, turbulence, air density, and stability

NREL's capabilities are accredited by the A2LA to perform the following validations in accordance with international standards:

- Acoustic noise to IEC 61400-11 and Measuring Network of Wind Energy Institutes (MEASNET)
- Power performance to IEC 61400-12-1 and MEASNET
- Mechanical loads to IEC 61400-13
- Power quality to IEC 61400-21 and MEASNET
- Duration testing to IEC 61400-2
- Safety and function to IEC 61400-2 and IEC 61400-22.

NREL also has a 7MVA controllably grid interface for grid related research as well as a 1MW solar array for hybrid research, and a 5MW dynamometer for drivetrain research.



Measurements and control signals at NREL

All turbines are extensively instrumented

GE: Fully instrumented drivetrain and bearings

SGRE: Blade pressure taps, fiber bragg

Research possibilities

NREL has executed open collaborations with the CART turbines and the GE1.5 turbine. Full access to turbine designs are only available for the CART turbine. Turbine simulations have been completed by NREL and partners for each turbine on campus in OpenFAST, BHawC, among other propriety codes. All types of wind research occur at the campus and they include: wakes, aeroelastic stability, aerodynamics, aeroacoustics, wildlife, drivetrain.

Contact data and more information

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