

PROBLEM SOLUTION

Date : 21 October 2022

Team ID : PNT2022TMID12095

Project Name : Predicting the energy output of wind turbine based on weather conditions

PREDICT WIND

- Utilize laser anemometer
- Predict wind direction, speed, duration, onset

MATCH LOAD

- Programming to manage system components thru sensors
- Compute kinetic energy of oncoming wind
- Instruct rotor to change pitch and rpm to optimize TSR

MAINTAIN OPTIMUM TIP-SPEED-RATIO (TSR)

- Adjust pitch and load to allow rotor to spin at optimum rpm

PREVENT OVERLOADING

- Torque and blade loading are minimized by allowing rotor to increase in RPM as load increases
- Machine shuts down and lays down when wind load approaches overload

REDUCE TRANSMISSION LOSSES

- Utilize proprietary hydrostatic drive

ELIMINATE PARASITIC LOSSES

- The fixed ratio gearbox, transformer, and inverter found in a CWM are parasites that rob power. All three are eliminated in the Uprise Energy Conversion System (ECS)

ELIMINATE REACTIVE POWER LOSSES

- Use of off-the-shelf synchronous generator eliminates the power factor problem and produces quality sine wave power.
- Induction generators are used in CWM because they cannot regulate RPM accurately to maintain 60 HZ in a variable wind condition. Consequences of using an induction generator are severe. Lagging power factors result, and reactive power is needed from the grid to compensate. Net power is reduced by an average of 15%