

# A Hybrid 48V (Wind/Solar) Residential Battery Back-up Power System



## The Problem:

- This customer built his system to help power his home during the many winter power outages that plague his town and he grew tired of cranking up his old gas generator and waiting in line to fill up his gas cans.

## The Solution: Using Morningstar's TriStar Charge Controllers & Relay Driver

- **TriStar Controller** for solar charge control for Solar PV Array.
- **TriStar Controller** operating as a Wind Diversion Charge Controller.
- **Relay Driver** to monitor battery voltage and amperage to make use of the excess solar and/or wind power when it is available.
- **Relay Driver** to apply a dynamic braking relay to control over-speeding of the wind turbine.

## How the Application Works:

- When the system's batteries are fully charged and there is excess wind power, it is diverted to a resistive load by the TriStar Charge Controller. (Why? If that extra power is not dealt with it will speed up the blades, causing them to potentially spin too fast & damage themselves).

***"Morningstar's TriStar Controller does an excellent job taking care of this .. preventing the over spin from occurring."***

- The solar-electric array is 2080 Watts made of four strings of four 12V nominal, 130W modules, to charge 48V battery bank made up of 16 deep-cycle golf-cart batteries—providing at least 24 hours of autonomous back-up power, with no wind or sun energy input.
- A **TriStar 60A PWM Charge Controller** takes care of the charging control delivering current from the array to the batteries to maintain them at maximum State of Charge without overcharging.
- A **Relay Driver** switches household loads from the grid to the inverter/charger when the batteries are charged and there is power available from the system to save on electric bills.
  - The Relay Driver can apply brakes to the turbine when needed.