Grid tie generator

Grid tie generator

A grid-tied electrical system, also called tied to grid or grid tie system, is a semi-autonomous electrical generation or grid energy storage system which links to the mains to feed excess capacity back to the local mains electrical grid. When insufficient electricity is available, electricity drawn from the mains grid can make up the shortfall. Conversely when excess electricity is available, it is sent to the main grid. When the Utility or network operator restricts the amount of energy that goes into the grid, it is possible to prevent any input into the grid by installing Export Limiting devices.

When batteries are used for storage, the system is called battery-to-grid (B2G), which includes vehicle-to-grid (V2G).

Direct Current (DC) electricity from sources such as hydro, wind or solar is passed to an inverter which is grid tied. The inverter monitors the alternating current mains supply frequency and generates electricity that is phase matched to the mains. When the grid fails to accept power during a "black out", most inverters can continue to provide courtesy power.

A key concept of this system is the possibility of creating an electrical micro-system that is not dependent on the grid-tie to provide a high level quality of service. If the mains supply of the region is unreliable, the local generation system can be used to power important equipment.

Battery-to-grid can also spare the use of fossil fuel power plants to supply energy during peak loads on the public electric grid. Regions that charge based on time of use metering may benefit by using stored battery power during prime time.

Local generation can be from an environmentally friendly source such as pico hydro, solar panels or a wind turbine. Individuals can choose to install their own system if an environmentally friendly mains provider is not available in their location.

A micro generation facility can be started with a very small system such as a home wind power generation, photovoltaic (solar cells) generation, or micro combined heat and power (Micro-CHP)[1] system.

Distributed generationBattery (electricity)

I have a small grid-connected solar PV system. If it is connected to my main load center via a two-pole breaker, how can I safely add a generator inlet to this system ?

The usual method is to connect a generator is via a NEMA 14-30 jack, which is connected to the load center via a two-pole breaker. An interlock prevents this two-pole breaker from being turned on until the main

breaker is first turned off; this prevents backfeeding the grid from the generator and endangering line workers. (Some jurisdictions do not allow a simple interlock, but rather a separate transfer switch, for which case my dilemma would not exist).

If the grid-tied solar inverter (GTI) is connected via another breaker, then, since there is no mechanism I know of which can interlock the main breaker with TWO branch-circuit breakers, it would be possible to have both the generator and the GTI connected to the load center simultaneously. This seems problematic. But, is this actually safe, because the GTI"s U1741 capability might prevent it from being activated, since it wouldn"t detect the generator"s output as being up to grid spec) ?

This is all moot if one connects the GTI to the line side of the main breakers (using insulation-displacement connectors such as those made by Buchanan). But even though I"ve done this, it seems un-wholesome, given that the wiring between the panel and the GTI (not to mention the inverter itself) is not protected by ANY over-current protection device (OCPD), notwithstanding what exists at the power-company"s transformer.