Introducing GLO Green Energy

GLO Management Solutions, LLC.

A division of GLO Management Solutions

GLO Green Energy is a supplier of clean power generation and energy delivery technologies. We can provide home owners, businesses and critical infrastructure customers with sustainable energy solutions from renewable resources such as solar, wind.

Why GLO Green Energy

We offer a diverse portfolio of technology systems along with services and solutions. We can deliver the right system that is designed to meet your project budget, operational goals and energy objectives.

It is our goal to educate and support your choice in smart, dependable clean "green" renewable energy.

The Green Energy Revolution

GLO Green Energy provides turnkey on-grid Solar and Wind electric solutions to a broad range of customers in the public and private sectors. Home and Business owners can count on GLO Green Energy to help them reduce or eliminate their facilities electric bill with a commercial energy system. Tax credits and rebates are available in many states who install green energy solutions. Visit www.dsireusa.org for the latest information about your area.

By harnessing the power of the sun or wind, people all over the world produce their own pollution free reliable electricity. Technology advances and the need for reliable power as well as the growing demand to reduce the use of fossil fuels and make renewable energy solutions attractive to people around the world. The use renewable sources such as wind and the sun increases our energy self sufficiency and fosters economic and national awareness. As more families, individuals and businesses generate their own renewable electricity we will reduce pollution, provide more electricity for all to use, reduce fossil fuels and make our electricity grid "greener"

Description of the process:

- ✓ ***STEP 1 - FEASIBILITY*:**

Feasibility analysis

Preliminary proposal

Sign Letter of Intent; assign Project Manager

- ✓ ***STEP 2 - FINANCING:***

Assessment of available incentives (tax credits, accelerated depreciation, state and utility rebates)

Evaluation of financing options, if needed (e.g. leases and power purchase agreements)

Preparation of paperwork; filing for non-tax based incentives

- ✓ ***STEP 3 - SITE PLANNING AND DESIGN:***

System Design

Project planning (working with facilities personnel)

In-depth engineering and logistical analysis

- ✓ ***STEP 4 - ENGINEERING:***

Specification of system details

Structural engineering, if required

Final system design and contract

Submittal to the building and planning departments

- ✓ ***STEP 5 - PROCUREMENT AND INSTALLATION***

Procurement of materials

Installation

Inspection

System commissioning and testing

- ✓ ***STEP 6 - OPERATIONS AND MAINTENANCE***

Training of facilities personnel (system monitoring and maintenance)

Administration and execution of all warranty coverage, if needed

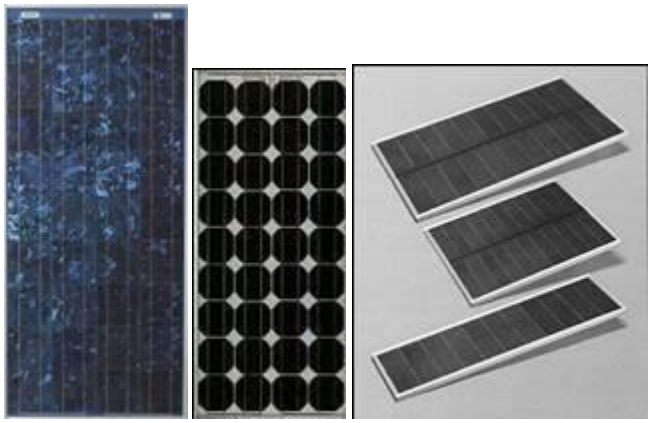
Field service and technical support, if required

GLO Green Energy understands that our customers require a reliable supply of clean and dependable power. Choices for conversion to power can vary driven by economics, availability and environmental factors.

Our service offerings are designed to help homeowners, businesses and telecommunications operators meet their operational goals, leveraging field expertise and unique technologies to deliver key results for your home, business or mission critical application.

SOLAR

Solar (photovoltaic or PV) modules produce direct current (DC) electricity from sunlight with no moving parts. Solar modules have been in use for over 50 years and in mass production since 1979. The reliability of PV is such that 20 to 25 year power warranties are typical, with life expectancies beyond 30 years.

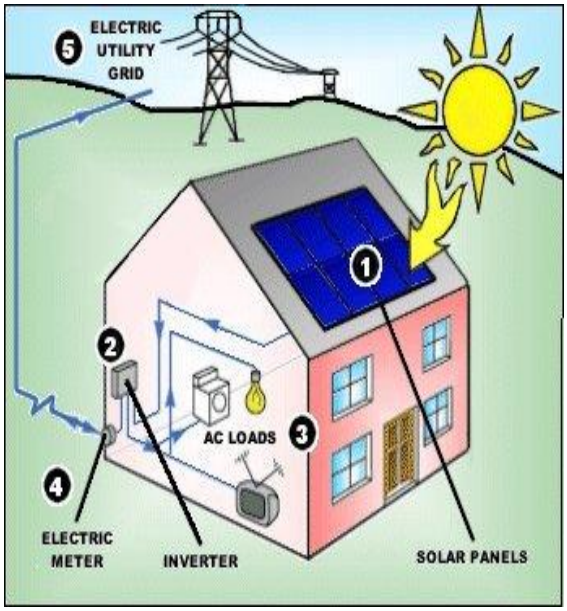


Multicrystalline Module Monocrystalline Module Amorphous (thin film) Module

Basic Grid-tie Solar (PV) Electric Systems

A typical grid-tie PV system consists of a series of solar modules, connected together to form an array. The array can installed on a roof or on ground or pole top mounts. When sunlight strikes the surface of the array, it produces direct current (dc) electricity. A UL listed, utility-grade inverter converts the direct current (dc) power from the PV array into alternating current (ac) power that exactly matches the voltage and frequency of the electricity flowing in the utility line. The electricity generated by these systems flows into the home's electric service panel and merges with the utility power. If the PV system is producing more energy than the home is using, the excess flows out into the utility grid, turning the utility meter backwards and generating a credit. If the home is consuming more energy than the PV system is producing, the meter turns in the forward direction. This is known as net metering.

All modern systems must conform to UL and utility safety and power-quality requirements. In the event of a power outage, safety switches in the inverter automatically disconnect the PV system from the line. This safety disconnect protects utility repair personnel from being shocked by electricity flowing from the PV array into what they would expect to be a "dead" utility line.
There are no storage batteries in this type of system. They are designed to turn off during a power outage and cannot function as a backup power system.



Wind Turbines

A Brief History of Small Wind Electric Turbines

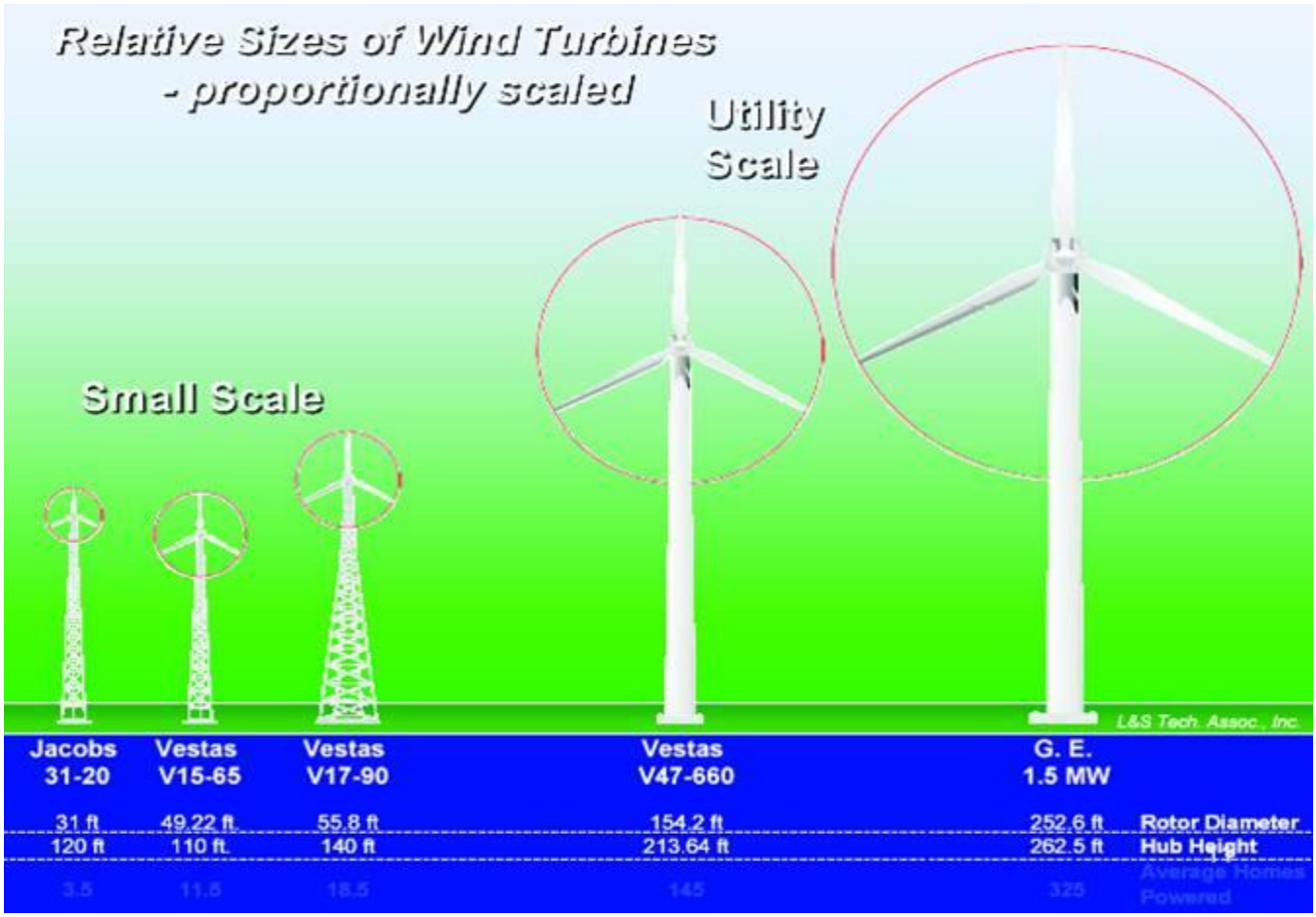
The first windmill for electricity production was built in Cleveland, Ohio by Charles Brush in 1888. By 1908 there were 72 wind generators in use, ranging in size from 5 kW to 25 kW. By the 1930's and 1940's, hundreds of thousands of wind electric turbines had been built in the U.S. and were typically used to provide electricity to farms far beyond the reach of power lines. These machines were in the 200 to 3,000 watt range and were configured to charge storage batteries which operated radio receivers and a few light bulbs. By the early 1950's, the Rural Electrification Administration (REA) had extended the utility grid to the majority of American households and the availability of low cost electricity eliminated the market for these machines.

The energy woes of the 1970's helped resurrect the small wind turbine industry. Fueled in large part by tax credits and the federal PURPA act, over 4500 small grid-tied wind systems were installed between 1976 and 1985. In 1985 oil prices dropped, the tax credits expired and the small wind industry was in limbo once again.

Today, the high cost of energy and the specter of another energy crisis are helping to increase public awareness of and demand for renewable energy solutions. The small wind industry is back!

The Definition of a Small Wind Turbine

The generally accepted definition is 100 kilowatts of rated power or less. However, as commercial turbine sizes increase, the definition of small wind is likely to increase as well. The following chart helps put it all into perspective.



This chart also illustrates the relationship between rotor diameter and rated power. Rotor diameter (as opposed to manufacturer's claims) is rapidly becoming the standard for determining a turbine's rated power.

How Small Wind Electric Turbines Work

Wind is created by uneven heating of the earth's surface by the sun. Wind energy is kinetic energy (mass and momentum) so indirectly it's solar energy!

The wind turbine converts the wind's kinetic energy into electricity. Most modern small wind turbines use a permanent magnet alternator or induction generator to accomplish this. Once the electricity leaves the turbine via the "down tower wiring," where it goes next is determined by the type of system it's connected to.

For a residential grid tie system, the electricity is processed to make it compatible with utility standards, and then fed into the household wiring at the breaker panel. This point of interconnection is where the power from the turbine "blends" with the utility power. From there it will flow into the home or out onto the utility grid, depending on the following conditions.

During periods of low or no wind, power is being purchased from the utility. As the wind speed increases, the turbine power production increases, reducing the amount power purchased from the utility. When the turbine output surpasses the home's electrical needs, the excess flows out to the utility grid and a credit is generated. This credit system is known as net metering.

For turbines used in off-grid homes, the electricity flows to a controller, where it's converted to DC (direct current), regulated and used to charge batteries. These batteries are used to power one or more inverters, which in turn provide standard 120/ 240 volt AC current for the home's appliances.

Maintenance

1) Low maintenance does not mean no maintenance
2) Inspection (and possibly maintenance) every 1-2 years. Inspection includes mechanical and electrical connections, checking for corrosion, guy wire tensionioning, inspect blades/replace leading-edge tape, etc.
3) Beyond 10 years blade or bearing replacement may be needed
4) Typical annual maintenance costs are typically 1% to 2% of installed cost
5) Lifetimes of 10 to 20 years expected with proper installation and regular maintenance

Wind Turbine Fuel

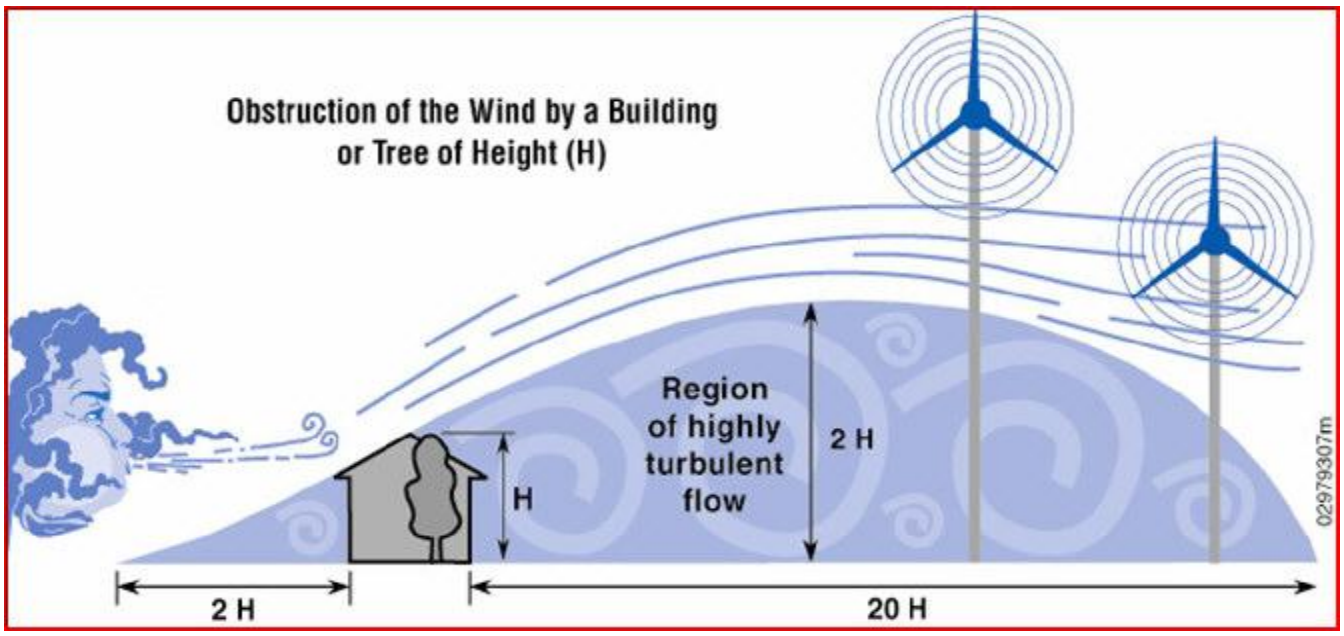
It's amazing how many people will pay good money for a small wind turbine and then install it on a short tower where it's starved for wind. You wouldn't starve an automobile for fuel and expect it to perform properly, so why expect that from your wind turbine??

It's actually quite simple: wind speed increases with height. Wind speed is affected by friction against the earth's surface, so the higher up the turbine is the more fuel it has to work with. It's not uncommon to see a 5-7% increase in energy production for every 20 feet of additional tower height above 80 feet. And the additional cost for that extra height is only about 2 to 3%. Over the life of the system, that adds up to a lot more energy produced and a much better return on your investment.

FYI:
Betz's law states that the energy content of the wind varies with the cube of the average wind speed. Simply put: double the wind speed and you increase the energy 8 times. Tower height is critical!!

Siting

another reason to avoid short towers is turbulence. When wind encounters obstructions such as trees and buildings it becomes turbulent. As this illustration shows, the turbulent zone extends well beyond the obstruction. A turbine installed within this zone will give poor performance. The turbulence will also stress the machine and tower, increasing the maintenance and decreasing the turbine's lifespan.

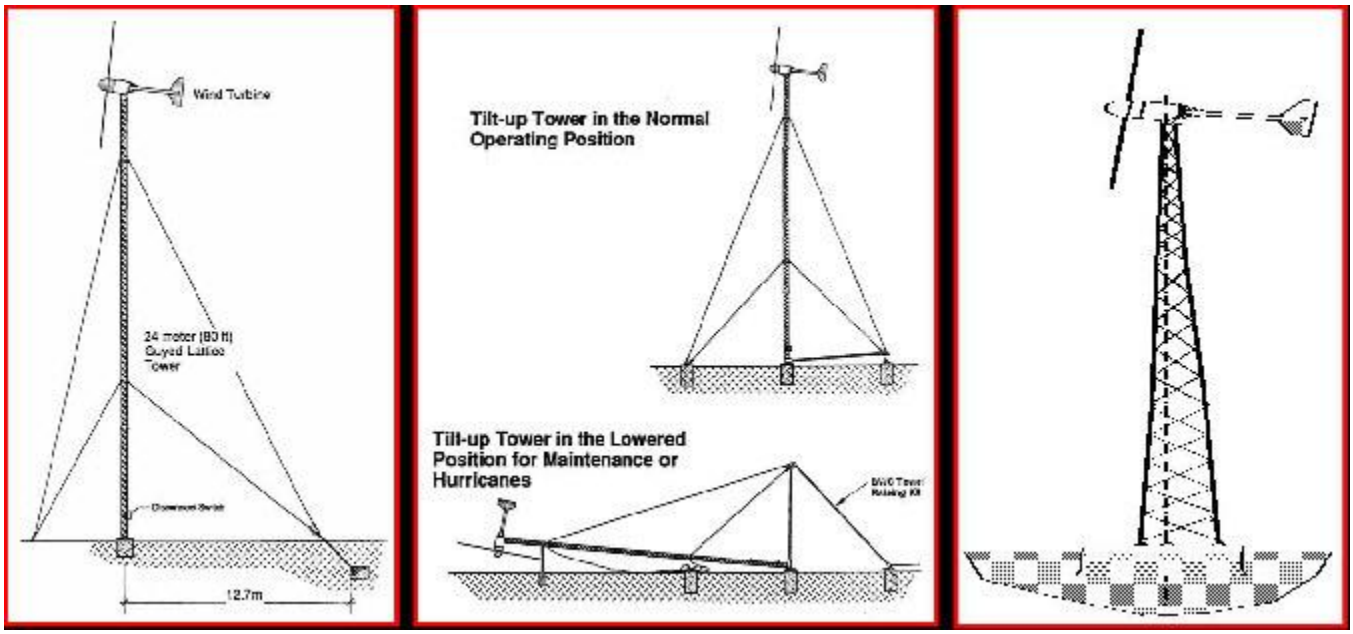


Site a turbine a minimum of 30 feet higher than obstructions within 500 feet even higher if those obstructions are trees!

"Trees will grow but the tower never will!"

<u>Tower Types</u>

The 3 most common tower types used for small wind turbines are the following



Guyed Lattice Tilt Up Self Supporting or SSV

The guyed lattice tower is the most economical for mid-sized turbines (5-10KW). This tower is shipped in sections, assembled on-site, turbine and wiring installed and a crane used to lift the completed assembly into place. The 100' and 120' versions are the most popular.

The tilt up tower is typically used on smaller turbines up to 5KW or so. And yes, there are larger turbines on tilt ups out there, but they are not very cost-effective option. This type of tower usually consists of pipe or tube held together with couplers, with guys at each coupler. A gin pole provides the leverage for raising/ lowering via a tow cable and pulley system. The tow cable is pulled with a winch or tow vehicle.

The self supporting 3 legged tower is the industry standard for turbines 10KW and up. This tower is assembled on-site and placed onto it's foundation by a crane. Of the 3 tower types shown here, this is the most expensive. When used with the larger turbines, it is still a cost-effective option.

Zoning and Permitting

This subject is probably the most complicated of all. Each municipality has its own unique zoning and land use regulations. The first step in any small wind project should be to find out if your town has any wind specific ordinances, tower height restrictions or anything else which might impact your project. A large number of potential wind projects stall at this point due to zoning and permitting barriers.