

# HY Energy Power System

Designes To Fit Homes & Buinesses  
HY Energy -Engineer To Build A Cleaner World



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GUANGZHOU HY ENERGY CO., LTD  
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## HY ENERGY HISTORY

2001 - Guangzhou HY Energy Co., Ltd was established.

2002 - The first generation wind turbine without mechanical speed limitation - HY-500W was developed successfully.

2003 - The second generation wind turbine HY- 150W developed successfully, which marked the coming of mould production era on small wind turbine.

2004 - The key development year of HY Energy. The third generation wind turbine HY-400 developed successfully. HY-400 wind turbine won the reputation in the industry at home and abroad through the trial of wind and solar hybrid street light project in Osaka airport, Japan.

2005 - HY Energy won the bid for wind and solar hybrid residential system in Honghu, Hubei, which is one of the aid projects from Netherland government, and finished wind and solar hybrid street light projects in the Chongming Island.

2006 - With several wind and solar hybrid power system projects, HY Energy faced a great opportunity. HY 600W wind turbine went into production.

2007 - HY-2000W wind turbine launched, meanwhile key breakthrough of matching design on small wind turbine had been achieved.

2008 - The first 5 blades wind turbine which is suitable in low wind speed condition emerged in China. HY Energy developed quickly under the environment of international financial crisis and drew high attention in the industry.

2009 - HY Energy developed more quickly. In addition to wind and solar hybrid street light, the application of wind and solar hybrid system for road and forest anti-fire remote monitoring, telecom base station etc. made breakthrough, which has led a larger application in real circumstance.

2010 - HY Energy annual sales increased by 60% compared with last fiscal year, more applications were developed in China and abroad, especially wind-solar hybrid power landscape projects.

2011 - HY Energy added an extension building of production facility and deployed two more professional machines for quality & turbine efficiency testing, and factory annual production capacity exceeded 12,000 sets.

2012 - HY Energy next-generation wind turbine Pegasus 1.5KW wind turbine launched at New Energy Fair, Husum, Germany, and Pegasus wind turbine was selected as the most innovative wind turbine of the fair.

2013 - HY Energy wind turbine and wind solar hybrid power system have been installed in over 89 countries; 7 pieces of HY-3000 wind turbine was installed at China Antarctic Scientific Research in Jan. 2013. More HYE wind turbine will serve at different application fields and harsh environment in the coming years.

## HY ENERGY

Guangzhou HY Energy Co., LTD is a high-tech manufacturer focused on design, production and application of high performance and reliable small wind turbine products. HYE factory was established in 2001 located in northern part of Guangzhou city, factory has 150 workers, and a 10 people R&D team dedicated in higher performance and reliability of HYE wind turbine. HYE owns 35 patent designs on wind turbine blade, slip ring, rotor structure, over-speed control system etc. Each and every component of HYE wind turbine is independently designed and manufactured in house. HYE factory owns advanced wind turbine quality testing equipments and a strict quality control system, all products will go through 22 quality control processes all in HYE factory facility. All products has certificated with CE, ETL, RoHS and ANAB.

With over 12 years experience in production and application of wind & solar hybrid power system, HY Energy has developed over 20 different application fields of wind and wind solar hybrid system such as residential grid-tie power system, residential off-grid power system, stand-alone wind solar hybrid street lighting, wind solar hybrid powered telecom tower, wind solar hybrid powered monitoring system etc. Most of these applications have been widely applied around world and enjoyed a good reputation by its system quality, reliability and professional pre-sales and after-sales service of HYE team. Furthermore, all components of each system solutions are either developed by HY Energy or customized and optimized by supporting vendor according to HYE wind turbine special features or some specific project, this could maximize the system power production and also improves reliability and compatibility of the system. Our engineering team could provide whole system design and full construction support base on your specific requirements. We believe soon you will benefit from our professionalism.

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- HY Wind Solar Hybrid Grid-tie System
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- HY Solar Street Lighting
- HY Wind Solar Hybrid Street Lighting
- HY Other Power System Applications

# HY Small Wind Turbine Special Features

## Patented Blade Design

Patented aerofoil 5 blade design with true symmetrical and twisted aerodynamic design which ensures rotor capture maximum power from wind ( $C_p > 0.35$  in low wind) and operates in amazingly low noise and minimal vibration.

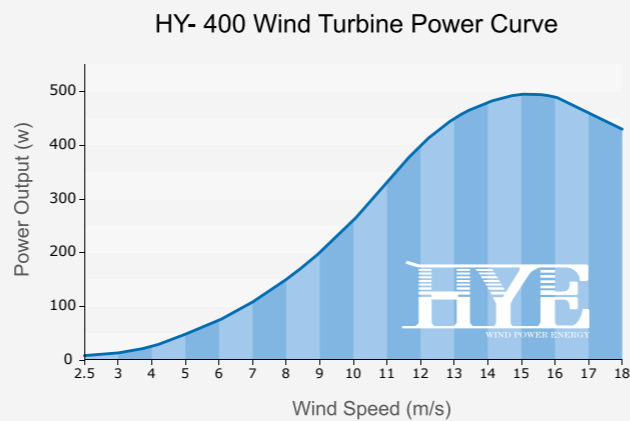


Blade side view

- True symmetrical and balanced aerofoil blade ensure rotor matching with generator perfectly
- Large ratio of tip section chord to root section chord and variable chord airfoil blade ensures rotor start-up easily and running smoothly with high torque & RPM at lower wind condition
- Aerodynamic blades designed with over-speed braking system to make sure generator well protected in higher wind.
- Reinforced nylon glass-fiber using advanced thermoplastic engineering and precision injection molding technology for higher strength, flexibility and reliability.
- $C_p > 0.35$  at low wind

## Over-speed Control System

Smart Blade Aerodynamics Braking and Electromagnetic Speed Limitation



This power curve generated by wind tunnel testing indicated that the blade aerodynamics braking system starts to take effect from 14-15m/s wind speed, the rotor RPM is always limited within wind turbine rated maximum RPM at even higher wind.

Abandoned the traditional failure-prone mechanical furling system, the blade itself is designed with over-speed braking system which will generate a reverse reluctant torque to lower the blade rotation speed so that the blades and generator can be well protected in higher wind, it solved safety and reliability problems facing by most small wind turbines.

Combination of Electromagnetic braking and aerodynamic braking maximizes energy capture by extending turbine's operating speed range into higher and lower wind speed which are missed by the old style wind turbines.

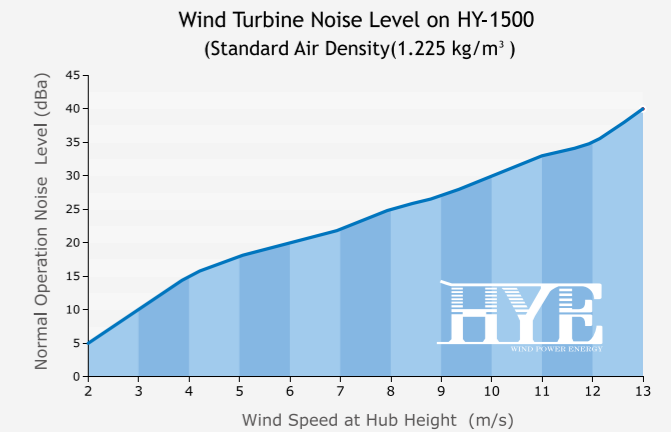
## Minimal Vibration and Low Noise Operation



Wind turbine with minimal vibration and low noise could be mounted on rooftop safely and its operation won't affect resident.

- The blades have exceptional consistency and aerodynamic outline with a mass distribution which ensures the rotor operate with minimal vibration and very low noise.
- Perfectly matched rotor and generator cause much less resonance of wind turbine and tower.
- Blade Aerodynamics Braking limits blade to rotate at rated RPM which could avoid higher noise and vibration caused by extreme wind.

Everything with moving parts will make some noise and vibration, and wind turbines are no exception, most noise and vibration are caused by turbine blades rotation in the wind and generator resonates with rotor and tower, HY Energy well designed wind turbine could works quietly in both low and high wind.



Wind Speed (m/s)	Normal Noise Operation Level (dBa)	Wind Speed (m/s)	Normal Noise Operation Level (dBa)
2	3	8	22
3	5	9	25
4	10	10	27
5	15	11	30
6	18	12	33
7	20	13	35

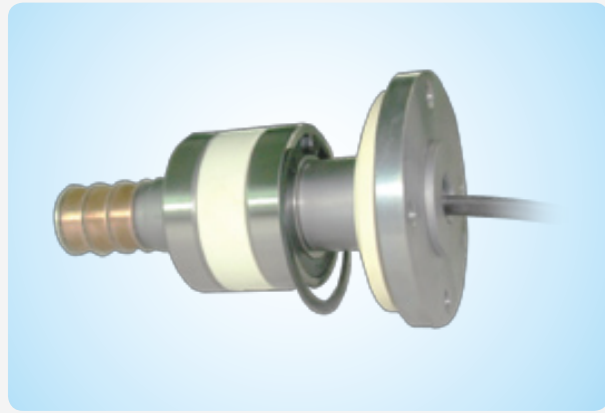
Distance: 50FT or 15m

## Maintenance Free Design



### Innovative two-moving-part system

Typical wind turbine has three moving parts(rotor, head yawing and mechanical furling), HY Energy replaced mechanical furling by using advanced electromagnetic and blade aerodynamics braking and take only two moving parts, which improves generator reliability dramatically as it has less mechanical failure.



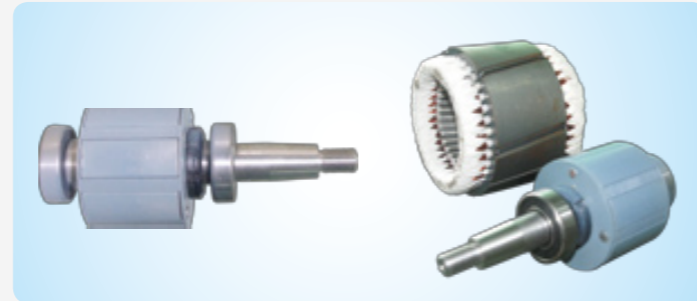
### Innovative slip ring design

Wind turbines with typical slip ring design often twists and tangles the connection cable from generator to controller, which made the system has to be maintained every few month. HY Energy patented slip ring design solved this problem completely and made HY wind turbine with higher reliability and real maintenance free.

### Best Material and Workmanship

#### Rotor and housing

Patented rotor is made of high quality stainless steel rotor shaft attached with permanent neodymium magnet, the unique winding and multi pole design reduces the start-up torque of alternator which assures generator would produce more power at lower wind condition than other system.



Generator housing is made of precisely casted aluminum alloy with minimal tolerance and sealed with high quality sealant, this is why HY wind turbine could work normally under various working conditions, and this is why HY wind generator features class B insulation and IP56 class protection. Besides, HY generator system is designed with a sufficient buffer of overload to ensure overall wind turbine reliability.



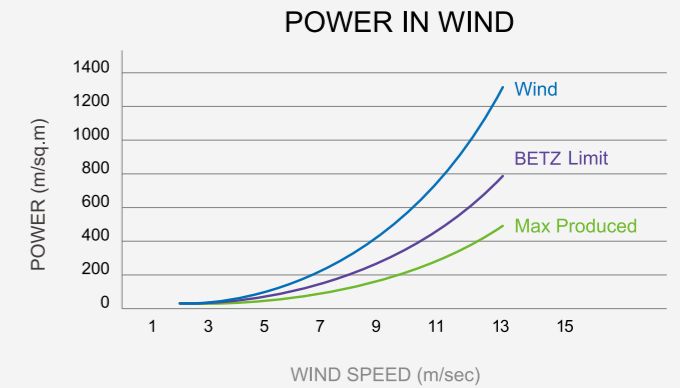
#### Blade

Blades are made from reinforced nylon glass-fiber by using advanced thermoplastic engineering and precision injection molding technology for higher strength, flexibility and reliability.



### HY High Efficiency Wind Turbines

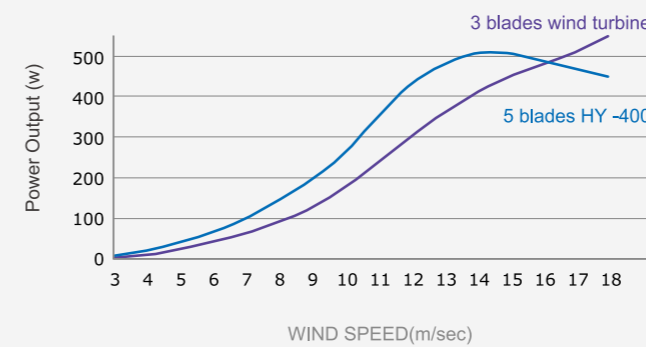
With HY R&D team efforts and years of technology accumulation and fine workmanship, HY wind 6th generation wind turbines proved an excellent performance, durability and reliability, following generator efficiency testing result shows what HY turbine is capable of and we expect you could start to test our wind turbine yourself. Results speak themselves!



Wind – shows power in the wind watt per square meter  
 BETZ limit – shows the theoretical maximum power could be captured from wind  
 Max produced – shows maximum power a wind generator could generate from wind

Power output chart

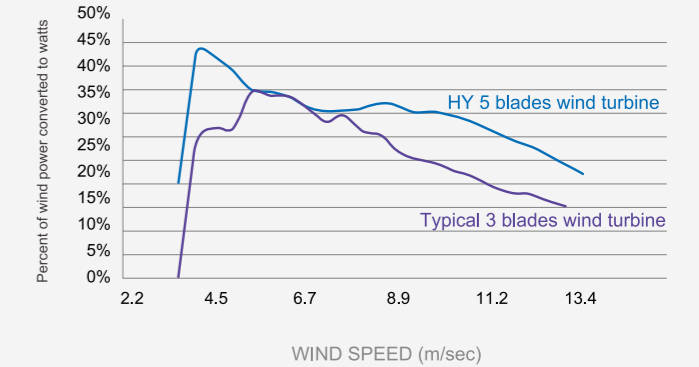
#### 5 BLADES & 3 BLADES WIND TURBINE POWER OUTPUT COMPARISON



5 blades HY-400 power curve shows excellent power output performance at lower wind speed, and the blades aerodynamics braking system starts to protect wind turbine from 14-15m/s wind speed

Typical 3 blades wind turbine generates lower power at low wind speed and no protection for wind turbine at higher wind speed, wind turbine may break down if dump loader doesn't work properly.

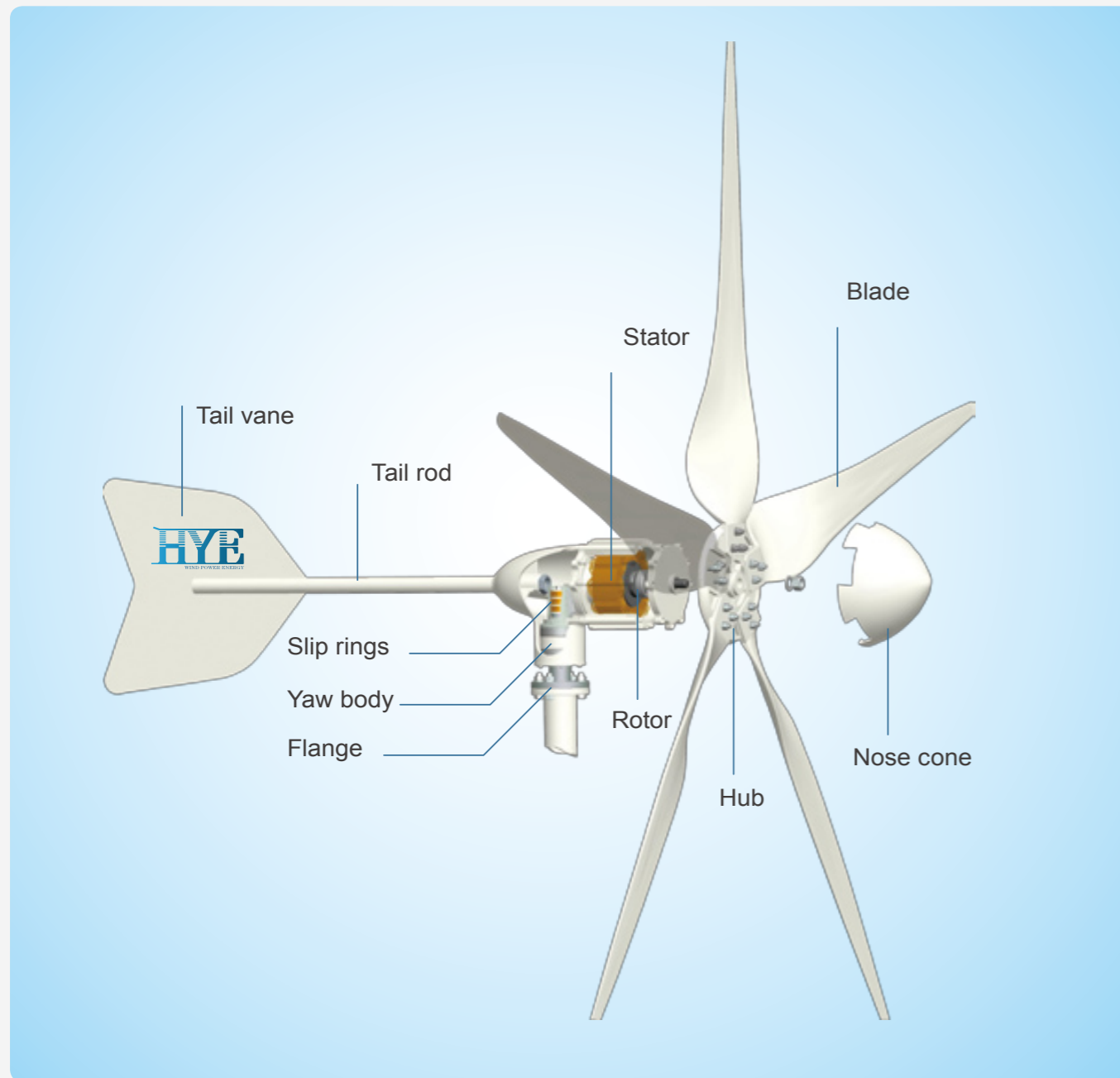
#### 5 BLADES & 3 BLADES WIND TURBINE EFFICIENCY COMPARISON



HY 5 blades wind turbine shows excellent wind power utilizing efficiency at lower wind (more than 40%), and also good performance at higher wind because smart blade aerodynamic braking could limit rotor speed within its rated RPM to keep generating power in higher wind.

Typical 3 blades wind turbine captures much less power from wind at lower wind speed, and wind power efficiency drops in higher wind because dump loader or mechanical furling braking system intermittently limits rotor speed in constantly changing wind, which results in average efficiency drop.

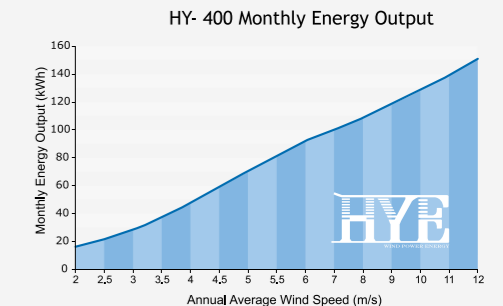
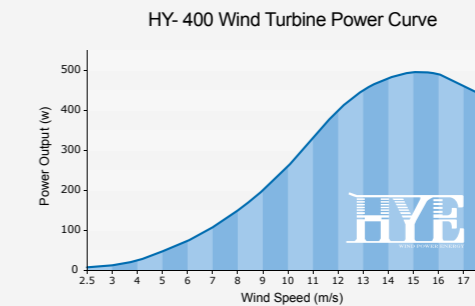
## HY Wind Turbine Structure and Special Features



### Product Special Features

- High Efficiency
- Light Breeze Start Up
- Long Lifetime, Free of Maintenance
- Light Weight, Easy Installation
- Heavy Wind Self-protection
- Minimal Vibration and Low Noise Operation
- Anti-rust & Anticorrosion
- Damp-proof & Sand-Proof

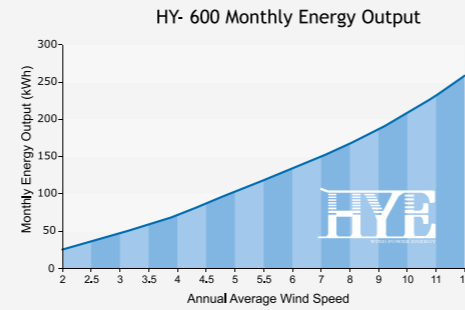
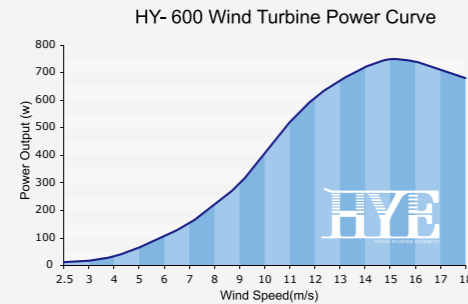
## HY-400 Technical Specifications



### Technical Specifications:

Model	HY-400
Rated Output	400W
Peak Output	500W
Rated Voltage(V)	DC12/24
Start-up Speed	2m/s or 4.5mph
Cut-in Speed	2.5m/s or 5.6mph
Rated Rotor Speed (RPM)	750
Rated Wind speed(m/s)	12m/s or 26.8 mph
System average Cp.	≥0.36
Rated Charging Current (A)	33.3/16.7
Noise Level	<20dB (5m behind turbine @ 5m/s gusting)
KWH/month (monthly avg.V=5.5m/s)	82
Working Temp. range °C	from -40°C to 60°C
Survival Max. Wind	50m/s or 110mph
Over-speed Control	Electromagnetic & blade aerodynamic braking
Number of Blades	5
Rotor Diameter(m)	1.55
Swept Area (m <sup>2</sup> )	1.89
Blade Material	Reinforced nylon glass-fiber
Generator Type	Brushless 3-phase with permanent Neodymium Magnet
Generator Material	Aluminum alloy body & precision stainless steel rotor
Net Weight	22KG
Tower Connection	flange connection or bolt-on clamp
Controller Type	PWM or with low voltage charging function
Applications	Stand alone, solar & wind hybrid system etc.
Product Life (years)	15
Warranty (years)	3
Years on Market	7
Certificate	ISO9001:2008, CE, RoHS, ETL

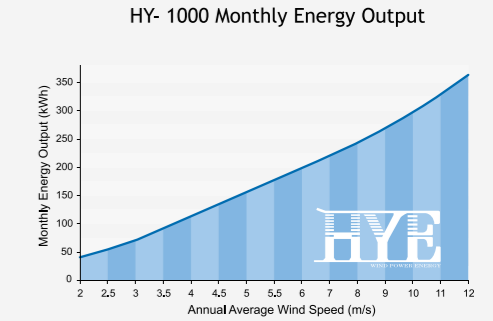
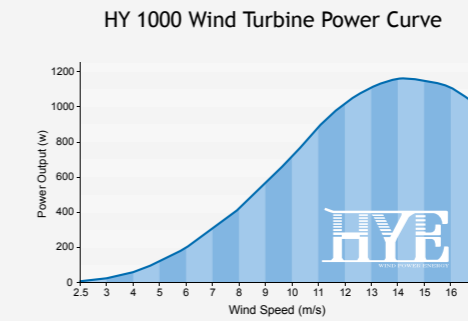
## HY-600 Technical Specifications



### Technical Specifications:

Model	HY-600
Rated Output	600W
Peak Output	750W
Rated Voltage(V)	DC24/48
Start-up Speed	2m/s or 4.5mph
Cut-in Speed	2.5m/s or 5.6mph
Rated Rotor Speed (RPM)	750
Rated Wind speed(m/s)	12m/s or 26.8 mph
System average Cp.	≥0.36
Rated Charging Current (A)	25/12.5
Noise Level	<20dB (5m behind turbine @ 5m/s gusting)
KWH/month (monthly avg.V=5.5m/s)	91
Working Temp. range °C	from -40°C to 60°C
Survival Max. Wind	50m/s or 110mph
Over-speed Control	Electromagnetic & blade aerodynamic braking
Number of Blades	5
Rotor Diameter(m)	1.75
Swept Area (m <sup>2</sup> )	2.4
Blade Material	Reinforced nylon glass-fiber
Generator Type	Brushless 3-phase PMA with high performance Neodymium Magnet
Generator Material	Aluminum alloy body & precision stainless steel rotor
Net Weight	25KG
Tower Connection	flange connection or bolt-on clamp
Controller Type	PWM or with low voltage charging function
Applications	Stand alone, solar & wind hybrid system etc.
Product Life (years)	15
Warranty (years)	3
Years on Market	6
Certificate	ISO9001:2008, CE, RoHS, ETL

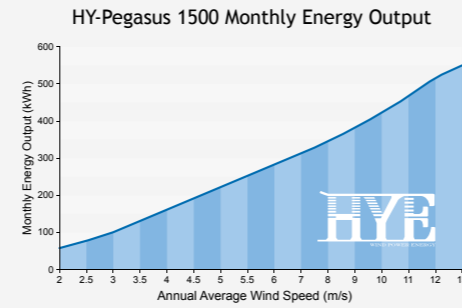
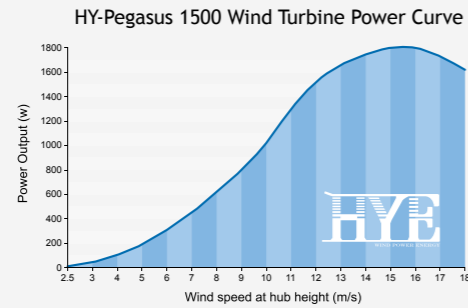
## HY-1000 Technical Specifications



### Technical Specifications:

Model	HY-1000
Rated Output	1000W
Peak Output	1200W
Rated Voltage(V)	Off-grid:DC24/48; On-grid: DC48/110
Start-up Speed	2m/s or 4.5mph
Cut-in Speed	2.5m/s or 5.6mph
Rated Rotor Speed (RPM)	750
Rated Wind speed(m/s)	12m/s or 26.8 mph
System average Cp.	≥0.36
Rated Charging Current (A)	Off-grid: 41.7/20.8
Noise Level	<20dB (5m behind turbine @ 5m/s gusting)
KWH/month (monthly avg.V=5.5m/s)	175
Working Temp. range °C	from -40°C to 60°C
Survival Max. Wind	50m/s or 110mph
Over-speed Control	Electromagnetic & blade aerodynamic braking
Number of Blades	5
Rotor Diameter(m)	1.96
Swept Area (m <sup>2</sup> )	3
Blade Material	Reinforced nylon glass-fiber
Generator Type	Brushless 3-phase PMA with high performance Neodymium Magnet
Generator Material	Aluminum alloy body & precision stainless steel rotor
Net Weight	28KG
Tower Connection	flange connection or bolt-on clamp
Controller Type	PWM or with low voltage charging function
Applications	Stand alone, solar & wind hybrid system etc.
Product Life (years)	15
Warranty (years)	3
Years on Market	4
Certificate	ISO9001:2008, CE, RoHS, ETL

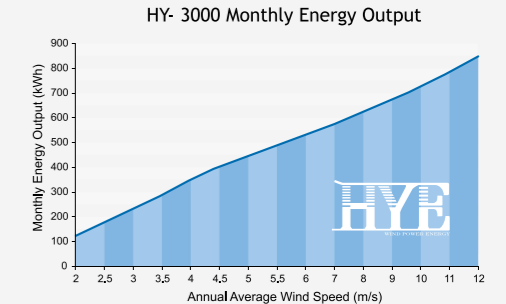
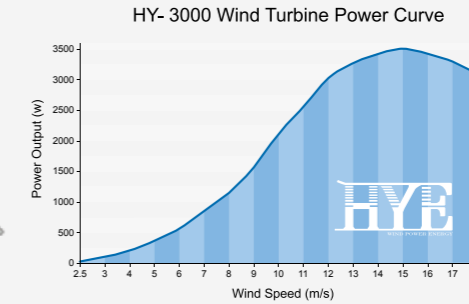
## HY-Pegasus 1500 Technical Specifications



### Technical Specifications:

Model	HY-Pegasus 1500
Rated Output	1500W
Peak Output	1800W
Rated Voltage(V)	Off-grid: DC48/110; On-grid: DC48/120/180
Start-up Speed	2m/s or 4.5mph
Cut-in Speed	2.5m/s or 5.6mph
Rated Rotor Speed (RPM)	700
Rated Wind speed(m/s)	12m/s or 26.8mph
System average Cp.	≥0.38
Rated Charging Current (A)	Off-grid: 31.2/13.6
Noise Level	<20dB (5m behind turbine @ 5m/s gusting)
Working Temp. range °C	from -40°C to 60°C
Survival Max. Wind	60m/s or 133mph
Over-speed Control	Electromagnetic, magnetic damping & blade aerodynamic braking
Number of Blades	5
Rotor Diameter(m)	2.05
Swept Area (m <sup>2</sup> )	3.3
Blade Material	reinforced nylon glass-fiber
Generator Type	Brushless 3-phase with permanent Neodymium Magnet
Generator Material	Aluminum alloy body & precision stainless steel rotor
Net Weight	35KG
Tower Connection	flange connection or bolt-on clamp
Controller Type	PWM or with low voltage charging function
Applications	stand alone, solar & wind hybrid system or grid-tie system etc.
Product Life (years)	20
Warranty (years)	5
Certificate	ISO9001:2008, CE, RoHS, ETL

## HY-3000 Technical Specifications



### Technical Specifications:

Model	HY-3000
Rated Output	3000W
Peak Output	3500W
Rated Voltage(V)	Off-grid: DC48/110; On-grid: DC110/220
Start-up Speed	2m/s or 4.5mph
Cut-in Speed	2.5m/s or 5.6mph
Rated Rotor Speed (RPM)	700
Rated Wind speed(m/s)	12m/s or 26.8 mph
System average Cp.	≥0.36
Rated Charging Current (A)	Off-grid: 62.5/27.3
Noise Level	<30dB (5m behind turbine @ 5m/s gusting)
KWH/month (monthly avg.V=5.5m/s)	495
Working Temp. range °C	from -40°C to 60°C
Survival Max. Wind	60m/s or 110mph
Over-speed Control	Electromagnetic & blade aerodynamic braking
Number of Blades	5
Rotor Diameter(m)	3
Swept Area (m <sup>2</sup> )	7.07
Blade Material	Reinforced nylon glass-fiber
Generator Type	Brushless 3-phase PMA with high performance Neodymium Magnet
Generator Material	Aluminum alloy body & precision stainless steel rotor
Net Weight	70KG
Tower Connection	Flange connection or reducing joint
Controller Type	PWM or with low voltage charging function
Applications	Stand alone, solar & wind hybrid system, grid-tie system etc.
Product Life (years)	15
Warranty (years)	3
Years on Market	4
Certificate	ISO9001:2008, CE, RoHS, ETL

## Wind Solar Hybrid Grid-tie System



Wind solar hybrid grid-tie system is an innovative system, which combines wind power and solar power into one grid-tie inverter with two separate but portion variable routes to control the input of both wind and solar power, such design would allow end users to adjust the capacity portion of solar and wind power according to installation site solar radiation and wind speed to reach a maximized efficiency.

HYGCI-H series wind solar hybrid grid-tie inverter is the core parts of the whole system; the inverter not only has excellent MPPT performance to obtain power from solar panels but also has a specially developed control unit according to HY series wind turbine special features with an optimized power curve pre-written into inverter and smart over-voltage braking for high wind protection, which offers a reliable combination of high efficiency, easy-installation, high wind protection and grid-failure protection.

### Benefit of Wind solar hybrid grid-tie system

**Generating power around-the-clock** – harvesting power from both wind and solar 24 hours regardless of night, heavy cloudy and rainy days, while ordinary solar grid-tie system could only go to “sleeping mode” at night, heavy cloudy and rainy days.

**More cost-effective solution** – instead of install two separate systems for both wind and solar grid-tie system, HYGCI-H series inverter integrated wind & solar controller and wind over-voltage braking into one device, which means one installation for you to go hybrid.

**Easy Installation** – System compact and light design with wind turbine and solar panel input sockets integrated at front panel, PLUG & PLAY for one-person installation.

**Constant output all year round** – with a proper portion of wind and solar installed as hybrid grid-tie system, wind turbine and solar panel could balance the seasonal power production difference and provides a fairly constant output all year round.

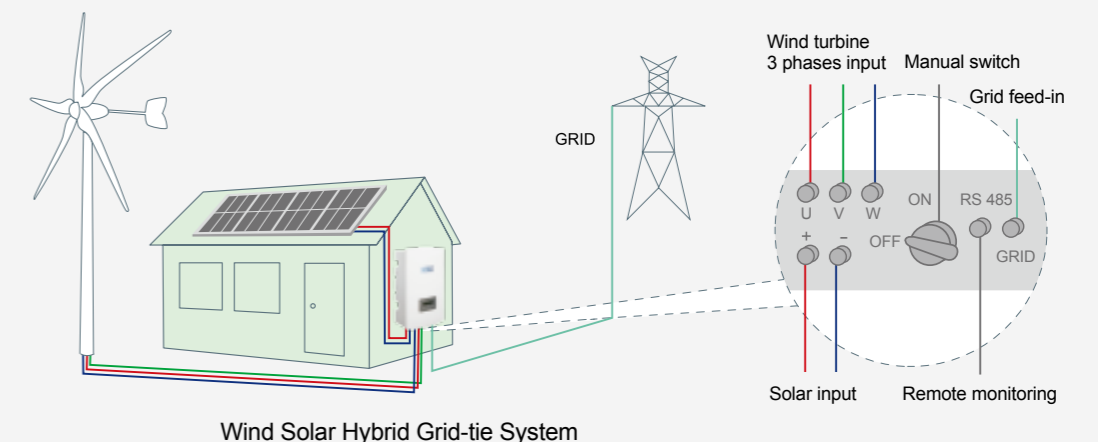
### Special Features

- Integrated solar & wind controller – one inverter controls all
- System efficiency Over 97%
- Ultra wide input voltage range
- Precise MPPT algorithm
- Controlled PWM inverter technology
- Compact and light design for one-person installation
- IP65, visually pleasing for domestic environment
- RS485, Wi-Fi, GPRS interface
- Suitable for household distributed installation

## Wind Solar Hybrid Grid-tie Inverter Specification

Model No.	HYGCI-H-10GL		HYGCI-H-20GL		HYGCI-H-30GL	
	Wind input	PV input	Wind input	PV input	Wind input	PV input
The max DC input voltage	500Vdc		500Vdc		600Vdc	
MPPT operation range	30-400Vdc	100-400Vdc	30-450Vdc	100-450Vdc	30-540Vdc	
DC normal voltage	250Vdc		250Vdc		300Vdc	
The max DC input current	10A	10A	10A	10A	10A	10A
Maximum input	1000W	1000W	2000W	2000W	3000W	3000W
Rated output	1000W (PV + wind in total)		2000W (PV + wind in total)		3000W (PV + wind in total)	
The transient max power	1100W		2200W		3300W	
Rated grid voltage	230Vac		230Vac		230Vac	
Grid voltage range	180-270Vac		180-270Vac		180-270Vac	
Operation phase	single phase		single phase		single phase	
rated grid output current	4.3A		8.7A		13A	
Rated grid frequency	50/60Hz					
Efficiency	>97%					
Protection	Isolation protection, temperature protection, short circuit protection DC reverse-polarity protection etc.					
Topology	transformerless					
Internal consumption	<1W(night)					
Ingress protection	IP65					
Interface	RS485 or Wi-Fi optional					
Standard Warranty	5 years					
Utility monitoring	Islanding protection, VAC FAC in accordance with UL1741, G83/1, AS4777, VDE0126-1-1					
EMC	EN61000-6-1:2007		EN61000-6-3:2007			
Grid standard	VDE4105/0126-1, UL1741, G83/1					

### System Circuit Diagram





## System Solution Detail

System Detail	HY-H10GTS-A	HY-H10GTS-B		
Wind turbine	HY-400	HY-600		
Solar panel	200W(24V) x 5	200W(24V) x 4		
wind solar hybrid grid-tie inverter	HYGCI-H-10GL	HYGCI-H-10GL		
Total capacity	1400W	1400W		
Suggested installation area	annual avg.wind speed <2m/s(4.5mph)	annual avg.wind speed >3m/s (6.7mph)		
Expected yearly power production(KWH)( base on medium solar radiation level)	1300KWH	1420KWH		
System Detail	HY-H20GTS-A	HY-H20GTS-B	HY-H20GTS-C	HY-H20GTS-D
Wind turbine	HY-400	HY-600	HY-1000	HY-1500
Solar panel	200W(24V) x 10	180W(24V) x 10	200W(24V) x 8	200W(24V) x 5
wind solar hybrid grid-tie inverter	HYGCI-H-20GL	HYGCI-H-20GL	HYGCI-H-20GL	HYGCI-H-20GL
Total capacity	2400W	2400W	2600W	2500W
Suggested installation area	annual avg.wind speed <2m/s(4.5mph)	annual avg.wind speed >3m/s (6.7mph)	annual avg.wind speed >5m/s (11mph)	annual avg.wind speed >7m/s (15.6mph)
Expected yearly power production(KWH)( base on medium solar radiation level)	2410KWH	2520KWH	3380KWH	4370KWH
System Detail	HY-H30GTS-A	HY-H30GTS-B	HY-H30GTS-C	HY-H30GTS-D
Wind turbine	HY-600	HY-1000	HY-1500	HY-3000
Solar panel	250W(24V) x 12	250W(24V) x 10	250W(24V) x 8	200W(24V) x 5
wind solar hybrid grid-tie inverter	HYGCI-H-30GL	HYGCI-H-30GL	HYGCI-H-30GL	HYGCI-H-30GL
Total capacity	3600W	3500W	3500W	4000W
Suggested installation area	annual avg.wind speed <2m/s(4.5mph)	annual avg.wind speed >3m/s (6.7mph)	annual avg.wind speed >5m/s (11mph)	annual avg.wind speed >7m/s (15.6mph)
Expected yearly power production(KWH) ( base on medium solar radiation level)	3620KWH	3760KWH	4460KWH	6880KWH

## Actual Installation



Cape Town, South Africa 2012



ÇANAKKALE, Turkey 2012



Kerala, India 2010



Pennsylvania U.S 2011

## Wind power grid-tie system

Wind power grid-tie system is a semi-autonomous electrical generation or grid energy storage system which links to the mains to feed excess capacity generated by wind turbine back to the local main electrical grid. When insufficient electricity is generated electricity drawn from the mains grid can make up the shortfall.

Residences and businesses that have a wind power grid-tie system permitted in many countries to sell their energy to the utility grid. Electricity delivered to the grid can be compensated in either net metering or feed-in-tariff, HYE wind power grid-tie system offers complete system solutions for both compensation ways.

HYGCI series wind power grid-tie inverter is the core part of the whole system, the inverter is developed specially for HY series wind turbine according to HY series wind turbine special features with an optimized power curve pre-written into inverter and smart over-voltage braking protection, which offers a reliable combination of high efficiency, easy-installation, high wind protection and grid-failure protection.

### Special Features

- Integrated Controller – easy for installation
- Integrated Isolation Transformer – extra safety protection
- Wider Input Voltage Range – harvesting more power from breeze to gale
- Programmable 20 Points of Power Curves – optimize power harvest from wind
- Optional Remote Monitoring system – Monitoring remotely your installation
- High Conversion Efficiency up to 95%
- Certified with DIN VDE 0126-1 Grid Standard
- 5 Years Warranty

### System Protections

- High Wind Protection – High wind protection with 10 minutes, 30 minutes and 4 hours time-lapse braking modes. It's a consideration of system safety under the worst wind condition in natural environment.
- Galvanic Isolation Protection – HYGCI-15CL is constructed and designed to assure maximum safety during installation and operation. The maximum possible degree of safety is being assured by galvanic isolation of input and output; In case of any grid AC power failure, the grid feed-in will be shut down automatically according to the country-specific standard (e.g. DIN VDE 0126-1-1)



HYGCI-10/15CL

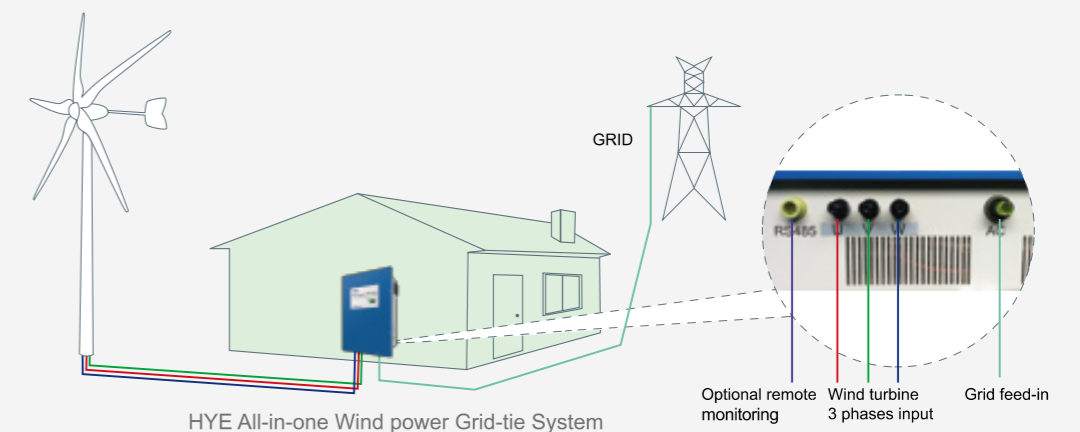


HYGCI-30CL

## System Solution detail

Model No.	HYGCI-10CL	HYGCI-15CL	HYGCI-30CL
<b>INPUT SIDE</b>			
DC Input Voltage Range(Power Curve)	40V-450V	40V-450V	60V-550V
Rated DC Input Power	1000W	1500W	3000W
Maximum DC Input Power	1100W	1600W	3300W
Power Curve Points	Max. 20 Points Programmable	Max. 20 Points Programmable	Max. 20 Points Programmable
<b>OUTPUT SIDE</b>			
Rated AC Power	1000W	1500W	3000W
AC Voltage Range	190-260V AC	190-260V AC	190-260V AC
Output Frequency Range	50Hz / 60Hz	50Hz / 60Hz	50Hz / 60Hz
Nominal Power Factor	>0.995	>0.995	>0.995
Max. Efficiency	95%	95%	95%
Stand-by Consumption	<7 W	<7 W	<7 W
Total Current Harmonic Distortion	<2%	<2%	<2%
<b>PHYSICAL</b>			
Dimensions(W×H×D)	555×420×125mm	555×420×125mm	480×680×235mm
Weight	29kg	29kg	56kg
Enclosure Rating	IP20	IP20	IP20
Installation	Wall-mounted	Wall-mounted	Wall-mounted
Ambient Temperature Range	-25℃ ~ +60℃	-25℃ ~ +60℃	-25℃ ~ +60℃
Cooling	Fan & Convection	Fan & Convection	Fan & Convection
Power Curve Points	Min.5, Max.20	Min.5, Max.20	Min.5, Max.20
Display	LCD & Signal Lamps	LCD & Signal Lamps	LCD & Signal Lamps
Communication	RS485	RS485	RS485
<b>SAFETY</b>			
Isolation	Transformer Isolated	Transformer Isolated	Transformer Isolated
Certificate	CE	CE	CE
Safety and EMC Standard	EN61000-6-1 EN61000-6-3 IEC 62103 EN50178	EN61000-6-1 EN61000-6-3 IEC 62103 EN50178	EN61000-6-1 EN61000-6-3 IEC 62103 EN50178
Grid Standard	VDE 4105/0126-1	VDE 4105/0126-1	VDE 0126-1-1, G83/1, UL1741

## System Circuit Diagram



## System Solution Detail

System Detail	HY-W10GTS	HY-W15GTS	HY-W30GTS
Rated AC output	1000W	1500W	3000W
Wind turbine	HY-1000 110V, 5 blade	HY-1500 120V, 5 blade	HY-3000 220V, 5 blade
Wind power grid-tie controller Inverter	HYGCI-10CL Rated DC Input: 1000W Max. DC input: 1100W Rated AC output: 1000W AC voltage range: 190-260V Output Frequency Range: 50-60Hz VDE 4105/0126-1 5 years warranty	HYGCI-15CL Rated DC Input: 1500W Max. DC input: 1600W Rated AC output: 1500W AC voltage range: 190-260V Output Frequency Range: 50-60Hz VDE 4105/0126-1 5 years warranty	HYGCI-30CL Rated DC Input: 3000W Max. DC input: 3300W Rated AC output: 3000W AC voltage range: 190-260V Output Frequency Range: 50-60Hz VDE0126-1, G83, UL1704 5 years warranty
Suggested Tower installation	HY-WF10 (3m) for wall fixation installation	HY-WF15 (3m) for wall fixation installation	HY-FRK30 (4m) for flat roof installation
	HY-FRK10 (4m) for flat roof installation	HY-FRK15 (4m) for flat roof installation	HY-HT30-10.4P3 hydraulic tower 10.4 meters
	HY-HT15-10.4P3 hydraulic tower 10.4 meters	HY-HT15-10.4P3 hydraulic tower 10.4 meters	HY-HT30-13.4P3 hydraulic tower 13.4 meters

## Estimated System Yearly Power Production(KWH)

Annual Avg. wind speed	3m/s	3.5m/s	4m/s	4.5m/s	5m/s	5.5m/s	6m/s	6.5m/s	7m/s	8m/s	9m/s
HY-W10GTS	810	950	1300	1490	1660	1920	2150	2320	2400	2580	2820
HY-W15GTS	1140	1350	1760	1990	2260	2600	2850	3040	3270	3560	3840
HY-W30GTS	2350	3030	3680	4220	4680	4980	5380	5750	5880	6340	6650

Remarks: Above system yearly power production is calculated base on annual average wind speed at 10 meter high free-standing tower installation under standard air density 1.225KG/m<sup>3</sup>, actual system production may varies with installation site air density and surrounding obstacle etc. You may input your target installation site location at following website to check more accurate wind speed data. ([www.gaisma.com/en](http://www.gaisma.com/en))

## Actual Installation



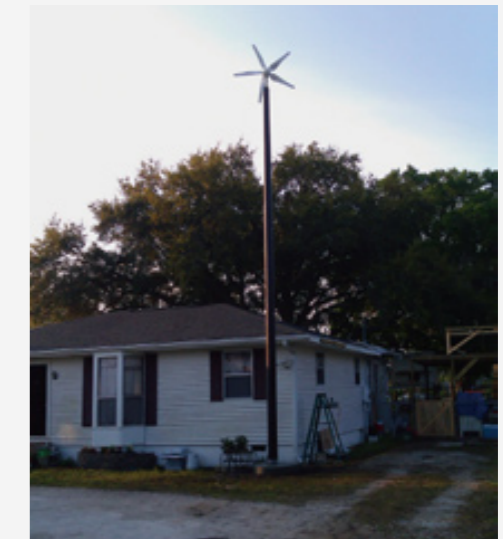
HY-1000 grid-tie system with wall fixation installation - Lyon France - 2011



HY-1000 grid-tie system with flat rooftop installation - Lebanon - 2008



HY-1000 grid-tie system with lattice tower - Liverpool UK- 2009



HY-1000 grid-tie system with free standing tower - California U.S - 2009



HY-1500 grid-tie system with 10.4m hydraulic tower installation - Sweden 2012



HY-3000 grid-tie system with 13.4m hydraulic tower installation - Florianopolis Brazil 2010

## Wind solar hybrid off-grid power system



A typical stand-alone system consists of a small wind turbine and solar panels to generate electricity connected to a charge controller which controls the pace at which batteries are recharged which is connected the battery bank. You will then need an off-grid inverter to convert the DC electricity stored in the battery bank to AC electricity which is more commonly used in home & business appliances.

Separately, wind and solar energy are effective ways to power a home or a business but can be limited due to lack of sun or a sudden shift in wind velocity. Using a combination of these will provide a stable, higher energy output to power your home or business. Wind solar hybrid power system includes a solar panel array and one or more wind turbines, and they create a more constant flow of power than either single source provided.

Wind & Solar hybrid power system provides a much more reliable power supply for 24 x 7 powers for off-grid applications. Off-grid systems can provide power anywhere; there is no shortage of possibilities or limits. Our packaged systems are ideally suited to remote homes, schools and other off-grid applications. They can also be retrofitted to existing diesel-generator systems to save on high fuel costs and minimize noise.

HY Energy offers standard hybrid systems solution with all necessary components such as solar panel, wind turbine, deep cycle battery, controller and inverter, mounting towers etc., each and every component has been well developed and tested for years in the fields and offers the highest levels of reliability, efficiency and ease of use, we can also custom design a system base on your project specific requirements.

## Major Application:

- Living off the grid, from large home to a small cabin
- Off-grid fishing or hunting cabins
- Remote security monitoring and communication facilities
- Remote mining and drilling operations
- RV or marine vessels
- Farms, ranches & vineyards
- Remote holiday hotel, military base camp
- Relief team or scientific research team working off the grid

## Benefit of Wind solar hybrid off-grid power system

**Minimize Your Impact** - Capturing the energy that is freely available in the wind and sun, you will be able reduce your impact on the environment - contributing to the health of our planet.

**Take Control** - Producing your own energy allows you to choose a clean, renewable energy source, allowing you to go green on your own terms.

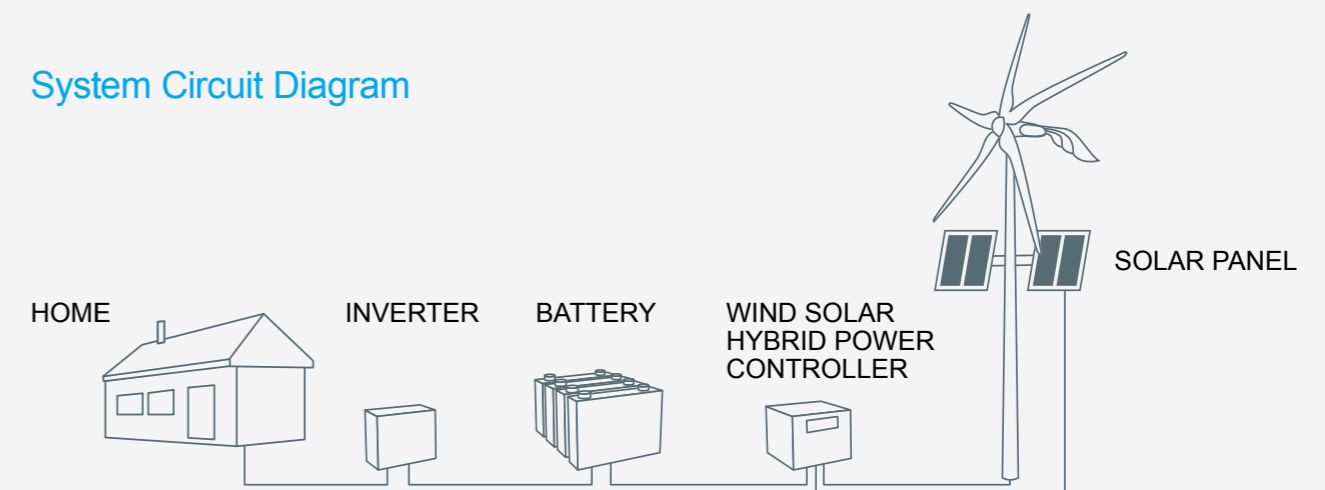
**Live off the grid** - Our wind/solar hybrid solutions allow you to live off the grid and overcome unreliable energy sources. Keep the power on.

**Save Money** - With ever-rising electricity prices, it will be a relief to take charge and lower your utility bills.

## HYE Wind Solar Hybrid Off-grid Power Systems Include:

- HY series small wind turbine 400W/600W/1000W/1500W/3000W
- High Quality Solar Modules with 25 Year Warranty
- Wind solar hybrid charge controller and MPPT & charging boost function
- 600W - 6000W Pure Sine Wave Inverter 110V/220V/230V/240V
- High Quality Deep Cycle Battery (100/150/200AH2/4/6/12V)
- PV Mounting Frames (Roof top, ground mount, pole mount etc.)
- Wind turbine towers (guyed tower, standing-free tower, hydraulic tower etc.)

## System Circuit Diagram



## System Solution Detail

System Detail	HY-H1GOS-Basic	HY-H2GOS-Starter	HY-H3GOS-Advance	HY-H6GOS-Premium	HY-H12GOS-Super
Rated Capacity	1000W	2000W	3000W	6000W	12KW
Wind turbine	HY-600 24V, 5 blade	HY-1000 48V, 5 blade	HY-1500 48V, 5 blade	HY-3000 96V, 5 blade	HY-3000 x 2 110V, 5 blade
PV modules	200W (24V) x 2	250W (24V) x 4	250W (24V) x 6	250W (24V) x 12	135W (12V) x 45
Wind Solar Hybrid off-grid controller Inverter	input: 600W wind/400W solar Output: 600W 110-240Vac 50/60hz Grid by-pass switch: optional	input: 1000W wind/1000W solar Output: 1000W 110-240Vac 50/60hz Grid by-pass switch: optional	input: 1500W wind/1500W solar Output: 1500W 110-240Vac 50/60hz Grid by-pass switch: optional	input:3000W wind/3000W solar Output: 3000W 110-240Vac 50/60hz Grid by-pass switch: optional	input: 6000W wind/6000W solar Output: 5000W 110-240Vac 50/60hz Grid by-pass switch: optional
Deep Cycle battery AGM gel	150AH x 2	150AH x 4	200AH x 4	200AH x 8	200AH x 18
PV module mounting bracket	flat roof/tile roof/corrugated Metallic roof/ ground mount	flat roof/tile roof/corrugated Metallic roof/ ground mount	flat roof/tile roof/corrugated Metallic roof/ ground mount	flat roof/tile roof/corrugated Metallic roof/ ground mount	flat roof/tile roof/corrugated Metallic roof/ ground mount
Suggested Tower installation	HY-WF10 (3m) for wall fixation installation	HY-WF10 (3m) for wall fixation installation	HY-WF15 (3m) for wall fixation installation	HY-FRK30 (4m) for flat roof installation	HY-FRK30 (4m) for flat roof installation
	HY-FRK10 (4m) for flat roof installation	HY-FRK10 (4m) for flat roof installation	HY-FRK15 (4m) for flat roof installation	HY-HT30-10.4P3 hydraulic tower 10.4 meters	HY-HT30-10.4P3 hydraulic tower 10.4 meters
	HY-HT15-10.4P3 hydraulic tower 10.4 meters	HY-HT15-10.4P3 hydraulic tower 10.4 meters	HY-HT15-10.4P3 hydraulic tower 10.4 meters	HY-HT30-13.4P3 hydraulic tower 13.4 meters	HY-HT30-13.4P3 hydraulic tower 13.4 meters

## Estimated System Yearly Power Production(KWH/year)

Annual Avg.wind speed	3m/s	3.5m/s	4m/s	4.5m/s	5m/s	5.5m/s	6m/s	6.5m/s	7m/s	8m/s	9m/s
HY-H1GOS-Basic	940	1020	1170	1310	1480	1680	1800	1910	2020	2180	2220
HY-H2GOS-Starter	1910	2050	2400	2590	2760	3020	3250	3420	3500	3680	3920
HY-H3GOS-Advance	2790	3000	3410	3640	3910	4250	4500	4690	4920	5210	5490
HY-H6GOS-Premium	5750	6300	6970	7500	7880	8400	8800	9110	9250	9520	9780
HY-H12GOS-Super	11500	12600	13940	15000	15760	16800	17600	18220	18500	19040	19560

## Estimated System Daily Power Production (KWH/day)

Annual Avg.wind speed	3m/s	3.5m/s	4m/s	4.5m/s	5m/s	5.5m/s	6m/s	6.5m/s	7m/s	8m/s	9m/s
HY-H1GOS-Basic	2.6	2.8	3.2	3.6	4.1	4.6	4.9	5.2	5.5	6.0	6.1
HY-H2GOS-Starter	5.2	5.6	6.6	7.1	7.6	8.3	8.9	9.4	9.6	10.1	10.7
HY-H3GOS-Advance	7.6	8.2	9.3	10.0	10.7	11.6	12.3	12.8	13.5	14.3	15.0
HY-H6GOS-Premium	15.8	17.3	19.1	20.5	21.6	23.0	24.1	25.0	25.3	26.1	26.8
HY-H12GOS-Super	31.5	34.5	38.2	41.1	43.2	46.0	48.2	49.9	50.7	52.2	53.6

Remarks: Above system yearly power production is calculated base on annual average wind speed at 10 meter high free-standing tower installation under standard air density 1.225KG/m³, actual system production may varies with installation site air density and surrounding obstacle etc. You may input your target installation site location at following website to check more accurate wind speed data.([www.gaisma.com/en](http://www.gaisma.com/en))

## Recommended household electric appliance - HY-H1GOS-Basic

Electric Equipments	Specification	Power(W)	Working hours	Daily power consumption(KWh)
Light	25W×3pcs	75	6	0.45
LCD TV	100W×1pc	100	5	0.5
fan	70W x 1pc	70	4	0.28
small fridge(50L)	120W x 1pc	120	24	0.4
laptop	85W×1pcs	100	6	0.6
other small home appliances	135W	135	2	0.27
total capacity suggested:		600W	total daily power consumption	2.5

## Recommended household electric appliance - HY-H2GOS-Starter

Electric Equipments	Specification	Power(W)	Working hours	Daily power consumption(KWh)
Light	25W×4pcs	100	6	0.6
LCD TV	125W×1pcs	125	8	1.0
Fridge	180W×1pcs	180	24	1.5
fan	70W x 2pcs	140	6	0.8
Washing Machine	250W×1pcs	250	1	0.3
laptop	85W×1pcs	100	4	0.4
other small home appliances	105W	105	4	0.4
total capacity suggested:		1000W	total daily power consumption	5.0

## Recommended household electric appliance - HY-H3GOS-Advance

Electric Equipments	Specification	Power(W)	Working hours	Daily power consumption(KWh)
Light	25W×4pcs	100	6	0.6
LCD TV	125W×1pcs	125	6	0.75
DVD player	150W x 1pcs	150	4	0.6
Fridge	200W×1pcs	200	24	1.5
fan	70W x 3pcs	210	6	1.26
Washing Machine	300W×1pcs	300	1.5	0.45
Computer	200W×1pcs	200	5	1
other small home appliances	170W	190	3	0.57
	total capacity suggested	1500W	total daily power consumption	6.7

## Recommended household electric appliance - HY-H6GOS-Premium

Electric Equipments	Specification	Power(W)	Working hours	Daily power consumption(KWh)
Light	25W×10pcs	250	6	1.5
LCD TV	125W×2pcs	250	8	2
DVD player	150W x 1pcs	150	4	0.6
Fridge	200W×1pcs	200	24	2
fan	70W x 3pcs	210	8	1.68
Washing Machine	300W×1pcs	300	2	0.6
Electric Cooker	250W×1pcs	250	2	0.5
Oven	1000W x 1pcs	1000	2	2
Computer	200W×1pcs	200	8	1.6
other small home appliances	190W	190	4	0.76
	total capacity suggested	3000W	total daily power consumption	13.2

## Recommended household electric appliance - HY-H12GOS-Super

Electric Equipments	Specification	Power(W)	Working hours	Daily power consumption(KWh)
Light	25W×16pcs	400	6	2.4
LCD TV	125W×2pcs	250	8	2
DVD player	150W x 1pcs	150	8	0.6
Fridge	200W×1pcs	200	24	2
fan	70W x 4pcs	280	8	2.24
Washing Machine	300W×1pcs	300	2	0.6
Oven	1000W x 1pcs	1000	2	2
Computer	200W×2pcs	400	10	4
water pump	1500W x 1pcs (2HP)	1500	5	7.5
other farming electric appliances	520W	520	10	5.2
	total capacity suggested:	5000W	total daily power consumption	28.5

## Actual Installations



1.5KW wind solar hybrid off-grid power system for residential - Bangalore India - 2011



10KW wind solar hybrid off-grid power system for villa – Shanghai 2009



1KW wind solar hybrid off-grid power system for residential - Hainan Island China - 2007



800W wind solar hybrid off-grid power system for remote village – Tibet 2006



4KW wind solar hybrid off-grid power system for small business enterprise rooftop – South Korea 2010



3KW wind solar hybrid off-grid power system for mining field – Chile 2008

# Solar Street lighting



Solar street lights are fresh alternative to traditional street lamps such as LPS, HPS, or MH street lights. LED lighting provides a multitude of advantages over conventional incandescent light: LED solar street lights are environmental friendly, energy efficient, and cost-effective. This smart, 'green' option for outdoor LED lighting has emerged on the green scene due to the recent technological advancements of LED illumination.

The system is mainly composed of solar panel, light source, controller and battery. In daytime, when there is sunshine, the solar panel can convert the solar energy to electric power and store it in maintenance-free battery. At night or rainy or cloudy condition, the controller can control the lights automatically on when day off, auto-off when day break, and the battery shall supply the power for lighting.

## Major Applications

- Major Roadways
- Residential Streets
- Pedestrian Walkways
- Parking Lots
- Docks and Piers
- Remote and Rural Locations
- landscape lighting
- Roundabouts
- Camp sites
- Beaches
- Service station

## Special Features

**Ultra-low maintenance & long product life** –5 years warranty on solar panels & LED light with rated for 60,000 hours of maintenance free operation, sealed deep cycle (AGM gel type) maintenance free battery.

**Green Light Source** - 40-70% less power consumption than other light sources. LED lights emit no light pollution, provides bright white light which improves color recognition and improves night visibility from 400%-1000% over other light sources.

**Flexible configuration** - solar lights can be easily configured to suite your requirements with solar module, wind module and battery banks

**Advanced control unit** - Solar light controller provides easy configuration, automatic operations and advanced work modes.

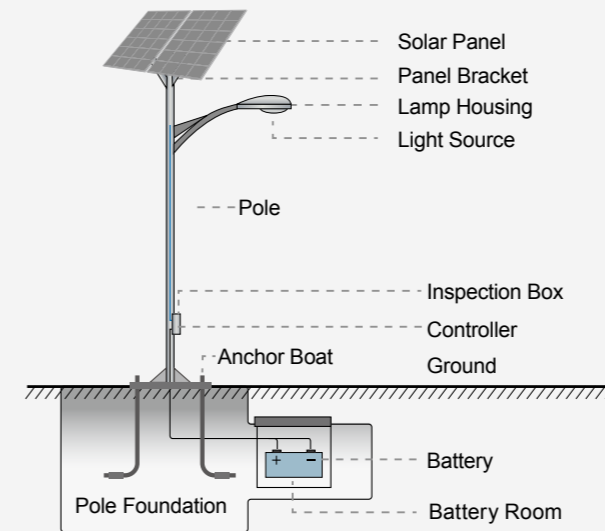
**3-5 days backup power** – for rainy, stormy and cloudy days

**Complete stand-alone & no bill to pay** –system is designed completely off-the-grid, there will never be an electricity bill to pay

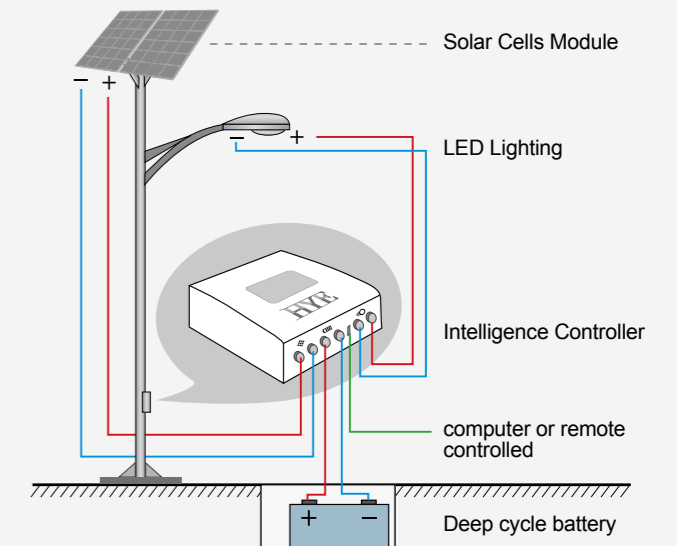
## HYE Solar Street Light Systems Include

- **Photovoltaic (PV) module** – monocrystalline/polycrystalline
- **Light source** – ultra bright LED light 20/30/40/60/80/90/120W
- **Controller** – 5/10/15A automatic light controller, automatic operation, multi work mode, over charge protection
- **Energy Storage** – sealed maintenance free AGM gel deep cycled battery
- **Battery Box** – water proof design battery box
- **Light Pole** – 6/8/10/12/16m light pole with 30/50m/s wind resistance

## Solar Street Light Structure



## System Circuit Diagram



## Operation time options

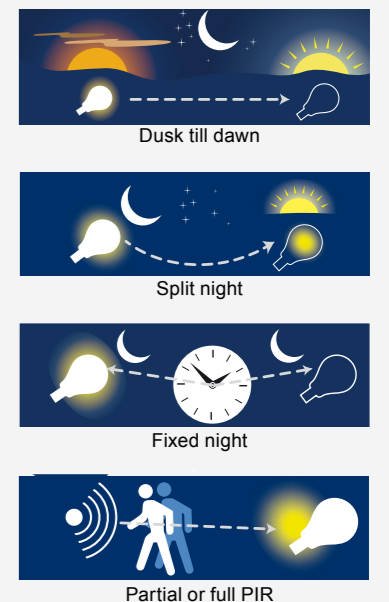
HY solar street light system has the added advantage of intelligent operation time that allows for a change in illumination levels throughout the course of a night. Illumination can be provided at its brightest level during peak times of pedestrian activity, and then dimmed to accommodate times of reduced usage.

**Dusk till dawn** - designed to provide a consistent level of illumination throughout the night, the dusk till dawn option turns the fixture on at dusk and off at dawn.

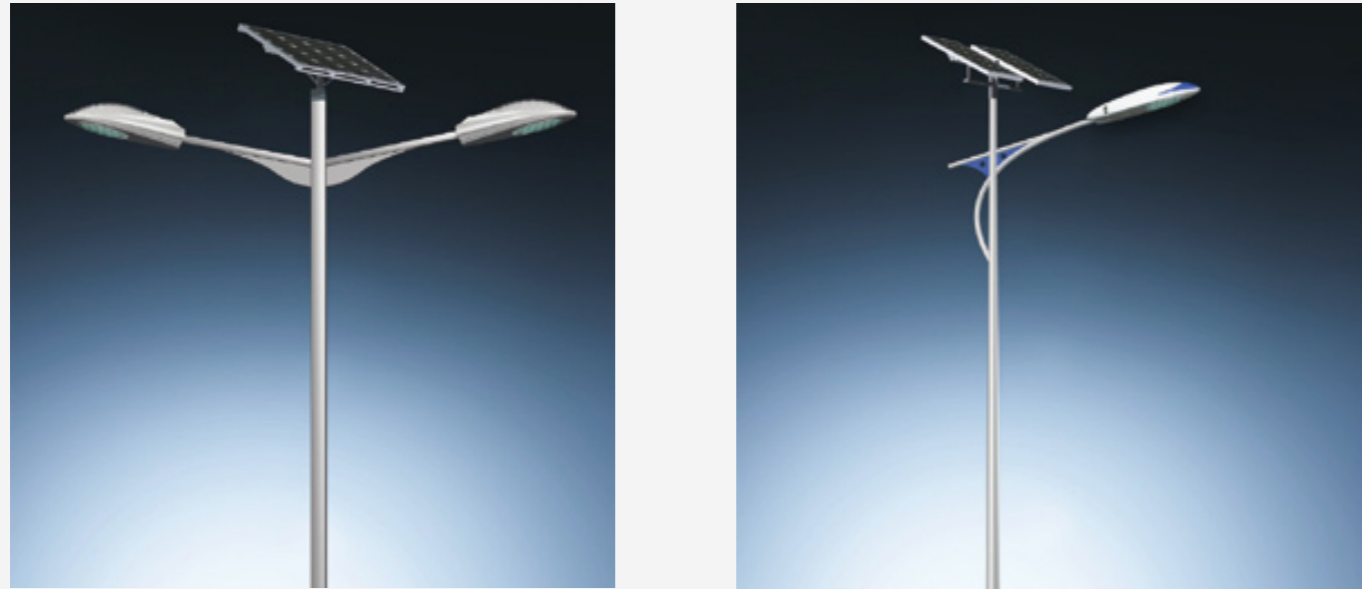
**Split night** - designed to provide alternating levels of illumination, a split-night profile turns the fixture on at full intensity for a set number of hours after dusk, and then reduces intensity down by a set percentage for the remainder of the night.

**Fixed night** - designed for a steady level of illumination, a fixed-night option turns the fixture on for a preset number of hours and then shuts it off.

**Partial or full PIR** - Passive Infrared (PIR) option enables the usage of motion detection to turn the streetlight on when pedestrians cross underneath the pole. The system can be setup to enable partial reliability on the PIR throughout the night



## Lamp Bracket – available in both single and dual fixture



## Actual Installations



30W LED solar lighting for mining field – Para Brazil - 2010



40W LED street lighting - Akaki Kality Ethiopia - 2011

## System Solution Detail

Major Component	HY-SL30	HY-SL40	HY-SL60	HY-SL80	HY-SL90
PV module	90W 12V	120W 12V	90W 12V x 2	120W 12V x 2	135W 12V x 2
Light source	30W LED	40W LED	60W LED	80W LED	90W LED
solar charge controller	12V/5A controller	12V/10A controller	24V/10A controller	24V/10A controller	24V/15A controller
battery	100AH 12V	120AH 12V	100AH 12V x 2	150AH 12V x 2	200AH 12V x 2
light pole	4/5/6M steel pole	5/6/8M steel pole	6/7/8M steel pole	8/9/M steel pole	8/9/10M steel pole



60W solar street light – Wuxi China 2011



45W LED solar lighting for factory plant - Guangzhou China 2010

## Remarks

- Above standard solution designed base on effective sunshine 5 hours per day
- Above standard solution designed for battery backup for 3 consecutive rainy and cloudy days
- Above standard solution designed base for 10 lighting hours, Lighting hours can be customized base on specific requirement and project site solar radiation level
- Light pole and light source shape can be custom designed to fit better into landscape
- Optional split night lighting & Passive Infrared (PIR)
- Above standard solutions for your reference only, for each specific project HYE will design the complete system according to project location solar resource condition and specific requirement about ground average LUX, illumination distribution, light color temperature etc. A complete system proposal will be provided by HYE with detailed data and graphic diagrams included.



80W LED solar street lighting project – Melaka Malaysia 2010



90W LED solar street light project – Denizli Turkey 2012



## Wind Solar Hybrid Street Light



Wind solar hybrid street lighting is an intelligent and complete stand-alone LED street lighting system. Composed of solar modules and small wind turbine, deep cycle batteries, controller and one or few street lights, this hybrid system harvests energy from both wind and solar and store it in deep cycle batteries to power street lights during night. Using a combination of wind & solar resources the system will provide a stable and constant flow of electricity to power the street lighting.

The major advantage of wind solar hybrid street lighting system is that when solar and wind power productions are used together, the reliability of the system is enhanced. Additionally, the size of battery storage can be reduced slightly as there is less reliance on one method of power production. Often, when there is no sun, there is plenty of wind. Wind speeds are often low in periods (noon time & summer) when the sun resources are at their best. On the other hand, the wind is often stronger in periods (evening time & spring, winter) when there are less sun resources. Even during the same day, in many regions worldwide or in some periods of the year, there are different and opposite patterns in terms of wind and solar resources. And those different patterns can make the wind solar hybrid systems the best option for street lighting.

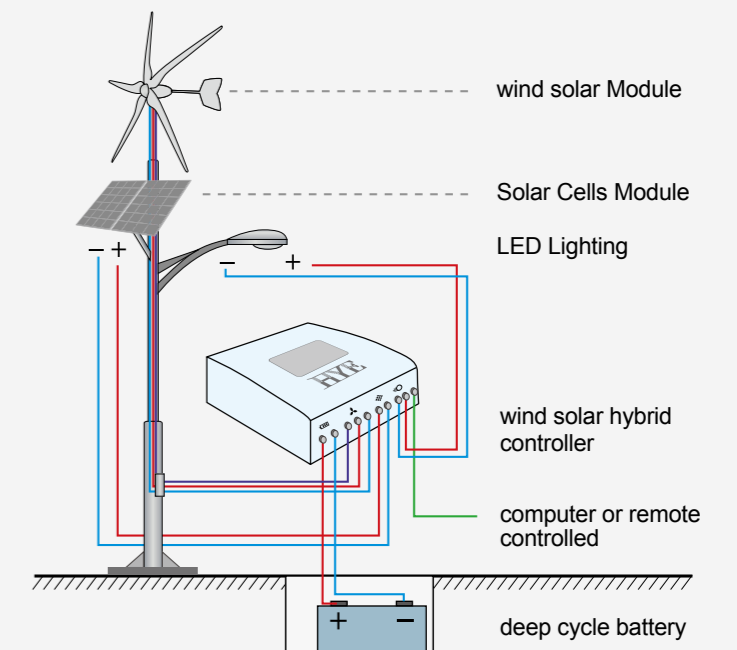
## Advantages Compare with Solar Street Lighting

- Wider applicable areas – hybrid system offers a much better reliability and sustainability to areas with less solar radiation level, long rainy season or long winter.
- Longer battery life – normally wind turbine generates more power during night, part of power generated will supply the light directly, part of power could charge the battery during night, so less charging and discharging loss from battery and also each battery charging cycle is prolonged.
- More cost-effective in windy areas – in the area with annual wind speed of 5-7m/s, wind solar hybrid system could have higher production to power higher capacity LED lights or more lights which could lower the system overall cost.
- Easier installation & Maintenance – solar street light system cannot put bigger (max. 360W in two sections) PV panels on light pole considering wind load; wind solar hybrid system allows bigger capacity installed on light pole, which could generate enough electricity to power 2-4 LED lights, which means one power system supply for 2-4 lights, it will be easy for installation and maintenance.

## HYE Wind Solar Hybrid Street Light System Include

- Photovoltaic (PV) module – monocrystalline/polycrystalline
- HY Series small wind turbine 400W/600W/1000W/1500W/3000W (12V/24/48/96V)
- Light source – ultra bright LED light 20/30/40/60/80/90/120W
- Controller – 5/10/15A wind solar hybrid controller, automatic light controller, automatic operation, multi work mode, over charge protection, high wind protection etc.
- Energy Storage – sealed maintenance free AGM gel deep cycled battery
- Battery Box – water proof design battery box
- Light Pole – 6/8/10/12/16m light pole with 30/50m/s wind resistance

## System Circuit Diagram



## Standard Solutions

### Unicorn Series - one power source one Light

Major Component	HY-SWL60A	HY-SWL80A	HY-SWL90A	HY-SWL120A
Wind turbine	HY-400 24V	HY-400 24V	HY-600 24V	HY-600 24V
PV module	60W 12V x 2	90W 12V x 2	100W 12V x 2	140W 12V x 2
Light source	60W LED	80W LED	90W LED	120W LED
hybrid charge controller	12V/10A controller	24V/10A controller	24V/10A controller	24V/15A controller
battery	100AH 12V x 2	120AH 12V x 2	150AH 12V x 2	200AH 12V x 2
Main pole(with power system)	10M, lamp height 6-8M	10M, lamp height 8-10M	12M, lamp height 8-10M	12M, lamp height 8-10M



### Triad Series - one power source three Lights

Major Component	HY-SWL20C	HY-SWL30C	HY-SWL40C	HY-SWL60C
Wind turbine	HY-400 24V	HY-600 24V	HY-600 24V	HY-1000 48V
PV module	60W 12V x 2	100W 12V x 2	140W 12V x 2	180W 24V x 2
Light source	20W LED x 3	30W LED x 3	40W LED x 3	60W LED x 3
hybrid charge controller	12V/10A controller	24V/10A controller	24V/15A controller	48V/10A controller
battery	100AH 12V x 2	150AH 12V x 2	200AH 12V x 2	150AH 12V x 4
Main pole(with power system)	10M, lamp height 4-6M	10M, lamp height 4-6M	10M, lamp height 4-6M	12M, lamp height 6-8M
Regular light pole	4-6M steel pole x 2	4-6M steel pole x 2	4-6M steel pole x 2	6-8M steel pole x 2

### Pegasus Series - one power source two Lights

Major Component	HY-SWL30B	HY-SWL40B	HY-SWL60B	HY-SWL80B	HY-SWL90B
Wind turbine	HY-400 24V	HY-400 24V	HY-600 24V	HY-600 48V	HY-1000 48V
PV module	60W 12V x 2	90W 12V x 2	140W 12V x 2	180W 24V x 2	180W 24V x 2
Light source	30W LED x 2	40W LED x 2	60W LED x 2	80W LED x 2	90W LED x 2
hybrid charge controller	12V/10A controller	24V/10A controller	24V/15A controller	48V/10A controller	48V/10A controller
battery	100AH 12V x 2	120AH 12V x 2	200AH 12V x 2	120AH 12V x 4	150AH 12V x 4
Main pole(with power system)	10M, lamp height 4-6M	10M, lamp height 4-6M	12M, lamp height 6-8M	12M, lamp height 8-10M	12M, lamp height 8-10M
Regular light pole	4-6M steel pole	4-6M steel pole	6-8M steel pole	8-10M steel pole	8-10M steel pole



one power source two Lights



one power source three Lights

### Sky Driven Series - one power source several Lights

Major Component	HY-SWL40D	HY-SWL60D	HY-SWL80D	HY-SWL90D	HY-SWL120D
Wind turbine	HY-3000 48V	HY-3000 48V	HY-3000 48V	HY-3000 48V	HY-3000 48V
PV module	900W of round panel	900W of round panel	900W of round panel	900W of round panel	900W of round panel
Light source	40W LED x 15	60W LED x 10	80W LED x 7	90W LED x 6	120W LED x 5
hybrid charge controller	48V/70A controller	48V/70A controller	48V/70A controller	48V/70A controller	48V/70A controller
pure sine wave inverter	800W 220/230V	800W 220/230V	800W 220/230V	800W 220/230V	800W 220/230V
battery	200AH 12V x 8	200AH 12V x 8	200AH 12V x 8	200AH 12V x 8	200AH 12V x 8
Main pole(with power system)	15M with round panel in 3 parts	15M with round panel in 3 parts	15M with round panel in 3 parts	15M with round panel in 3 parts	15M with round panel in 3 parts
regular light pole	4-6M steel pole x 15	6-8M steel pole x 10	8-10M steel pole x 7	10-12M steel pole x 6	10-12M steel pole x 5



one power source several Lights

### Remarks

- Above standard solution designed base on effective sunshine 5 hours per day and project site annual average wind speed 3-3.5m/s.
- Above standard solution designed for battery backup for 3 consecutive rainy and cloudy days
- Above standard solution designed base for 10 lighting hours, Lighting hours can be customized base on specific requirement and project site wind and solar resource condition.
- Light pole and light source shape can be custom designed to fit better into landscape
- Optional split night lighting & Passive Infrared (PIR)
- Above standard solutions for your reference only, for each specific project HYE will design the complete system according to project location wind & solar resource condition and specific requirement about ground average LUX, illumination distribution, light color temperature etc. A complete system proposal will be provided by HYE with detailed data and graphic diagrams included.

### Actual Installation



40W LED wind solar hybrid street light for park –Tabriz, Iran - 2011



60W LED wind solar hybrid street light – Saipan Island, CNMI - 2009



80W LED wind solar hybrid street light - Kashgar, Xinjiang 2012



90W LED wind solar hybrid street light - Ussuriysk city, Russia 2010



Pegasus 1 power 4 system 40 LED street light – Unionpay headquarter, Shanghai 2012



Sky Driven system power 7pc 85W LED street light – suburb Guangzhou 2011

## Other Power System Application

### Wind Solar Hybrid Off-grid Power System For Telecom Tower



10KW wind solar hybrid off-grid power system for telecom tower – Baili Island, Zhuhai 2011



3KW wind solar hybrid off-grid power system installed on existing telecom tower as a backup power system – Hainan China 2012

### Wind Powered Landscape Lighting



Total 33KW wind power array off-grid power system for eco-park lighting – 11pcs of HY-3000 wind turbine created off-grid system to power all lights of Binjiang Eco-green park, system is designed and constructed by HYE– Shanghai 2010



### Wind Solar Hybrid off-grid Monitoring System



wind solar hybrid off-grid monitoring system for highway – Shaoyong Highway Guangzhou 2009



Wind solar hybrid off-grid monitoring system for oil field – Qinghai 2011

### Wind solar hybrid off-grid powered seawater desalination system



18KW wind powered stand-alone sea water desalination system - Bureau of Fishery, Fujian 2008



21KW wind powered stand-alone sea water desalination system – Nanpeng island, Shantou 2010