


LAMPIRAN

Lampiran 1. Izin Penelitian

1. Surat permohonan izin pengambilan data dari Universitas Muhammadiyah Yogyakarta.

 **UMY** UNIVERSITAS MUHAMMADIYAH YOGYAKARTA | **TEKNIK ELEKTRO**

Nomor : 079/D.2-II/TA-TE/V/2019
Lamp : -
Hal : **Permohonan Ijin Pengambilan Data**

Kepada Yth
Kepala Desa Sendang
Sendang, Kec. Donorojo, Kab.Pacitan

Assalamu'alaikum warahmatullaahi wabarakaatuhu

Dengan hormat,
Sebagai salah satu syarat untuk menyelesaikan studi jenjang S1 di Fakultas Teknik Universitas Muhammadiyah Yogyakarta, setiap mahasiswa diwajibkan melaksanakan Tugas Akhir / Skripsi.

Sehubungan dengan hal tersebut, maka kami selaku Pimpinan Program Studi S1 Teknik Elektro mengajukan permohonan ijin Penelitian Tugas Akhir di Sendang pada proyek Analisis potensi Sumber Daya Bayu dan Surya untuk mahasiswa berikut :


Nama Mahasiswa : **Firmansyah Harahap**
Nomor Mahasiswa : **20150120067**
Program Studi : **S1 Teknik Elektro**
Judul TA / Skripsi : **Analisis Potensi Sumber Daya Bayu dan Surya Serta Perancangan Pembangkit Listrik Tenaga Hibrida (PLTH) Berbasis Aplikasi Homer di Pantai Klayar, Pacitan**

Dosen Pembimbing I : **Dr. Ramadoni Syahputra, S.T., M.T.**
Dosen Pembimbing II : **Anna Nur Nazilah Chamim, S.T., M.Eng**

Adapun pelaksanaannya kami harapkan atau pada waktu lain yang sesuai dengan kebijaksanaan Instansi/Perusahaan yang Bapak/Ibu pimpin.

Demikian permohonan ini kami sampaikan, atas perhatian dan perkenannya kami ucapkan terima kasih.

Wassalamu'alaikum warahmatullaahi wabarakaatuhu

Yogyakarta, 25 Mei 2019
Ketua Program Studi

Dr. Ramadoni Syahputra, S.T., M.T.

Tembusan :
1. Arsip TU
2. Dosen Pembimbing
3. Mahasiswa ybs

ADDRESS
Gedung F.3.11, 2 Kampus Terpadu UMY
Jl. Lingkar Selatan, Tamantirto,
Kasihan, Bantul,
Daerah Istimewa Yogyakarta 55183

CONTACT
Phone : +62 274 - 587656 ext.211 (Ruang Pengurus), ext.230 (Lab. & Ruang Dosen)
Fax : +62 274 - 587645
Email : elektro@umy.ac.id

<http://elektro.umy.ac.id>

2. Surat izin penelitian dari Kepala Desa Sendang, Kecamatan Donorojo, Kabupaten Pacitan, Provinsi Jawa Timur.



PEMERINTAH KABUPATEN PACITAN
KECAMATAN DONOROJO
DESA SENDANG
 Jalan Punung-Kalak Km 11. Sendang
 KodePos 63551

SURAT IJIN PENELITIAN
 Nomor : 470/34/408.61.10/2019

Yang bertanda tangan dibawah ini Kepala Desa Sendang, Kecamatan Donorojo, Kabupaten Pacitan menerangkan bahwa :

N a m a	:	FIRMANSYAH HARAHAHAP
Tempat/Tanggallahir	:	Batam, 12-06-1996
NIK	:	217110120996001
Jeniskelamin	:	Laki-laki.
Kebangsaan	:	Indonesia
Agama	:	Islam
No Mahasiswa	:	20150120067
Program studi	:	S1 Teknik Elektro
Judul TA/Skripsi	:	Analisis Potensi Sumber Daya Bayu dan Surya serta Perancangan Pembangkit Listrik Tenaga Hibrida (PLTH) Berbasis aplikasi Homer Di Pantai Klayar ,Pacitan

Kami Telah memberikan ijin terhadap penelitian tersebut diatas.

Demikian Surat Keterangan ini dibuat untuk dapat dipergunakan Sebagai mestinya



Sendang, 24 Juni 2019
 Kepala Desa Sendang
W I N A R T O, S. I P


3. Data Kependudukan Desa Sendang, Kecamatan Donorojo, Kabupaten Pacitan, Provinsi Jawa Timur.

**LAPORAN MUTASI KEPENDUDUKAN DESA SENDANG
KECAMATAN DONOROJO
KEADAAN BULAN MARET 2019**

NO	DUSUN	PENDUDUK AWAL BULAN			JML KK	JML KS	LAHIR BULAN INI			MATI BULAN INI			DATANG BULAN INI			PINDAH BULAN INI			JUMLAH PENDUDUK AKHIR BULAN			JML KK	JML KS
		L	P	L+P			L	P	L+P	L	P	L+P	L	P	L+P	L	P	L+P	L	P	L+P		
1	KRAJAN	56	66	122	39	34													56	66	122	39	34
2	GEDANGAN	75	55	130	39	37													75	55	130	39	37
3	KALIAREN	286	322	608	203	185								1					285	322	607	203	185
4	KENDAL	230	216	446	155	139						1							230	217	446	156	139
5	SAMBI	107	103	210	64	46													107	103	210	64	46
6	GUOREJO	267	291	558	193	145						1							167	291	558	194	145
7	NGEJIRING	239	263	500	178	129									1	1			138	262	500	177	128
8	WONOKERTO	125	114	239	90	60													125	114	239	89	60
	JUMLAH	1385	1430	2815	961	775													1383	1430	2813	961	774

SENDANG, 01 APRIL 2019

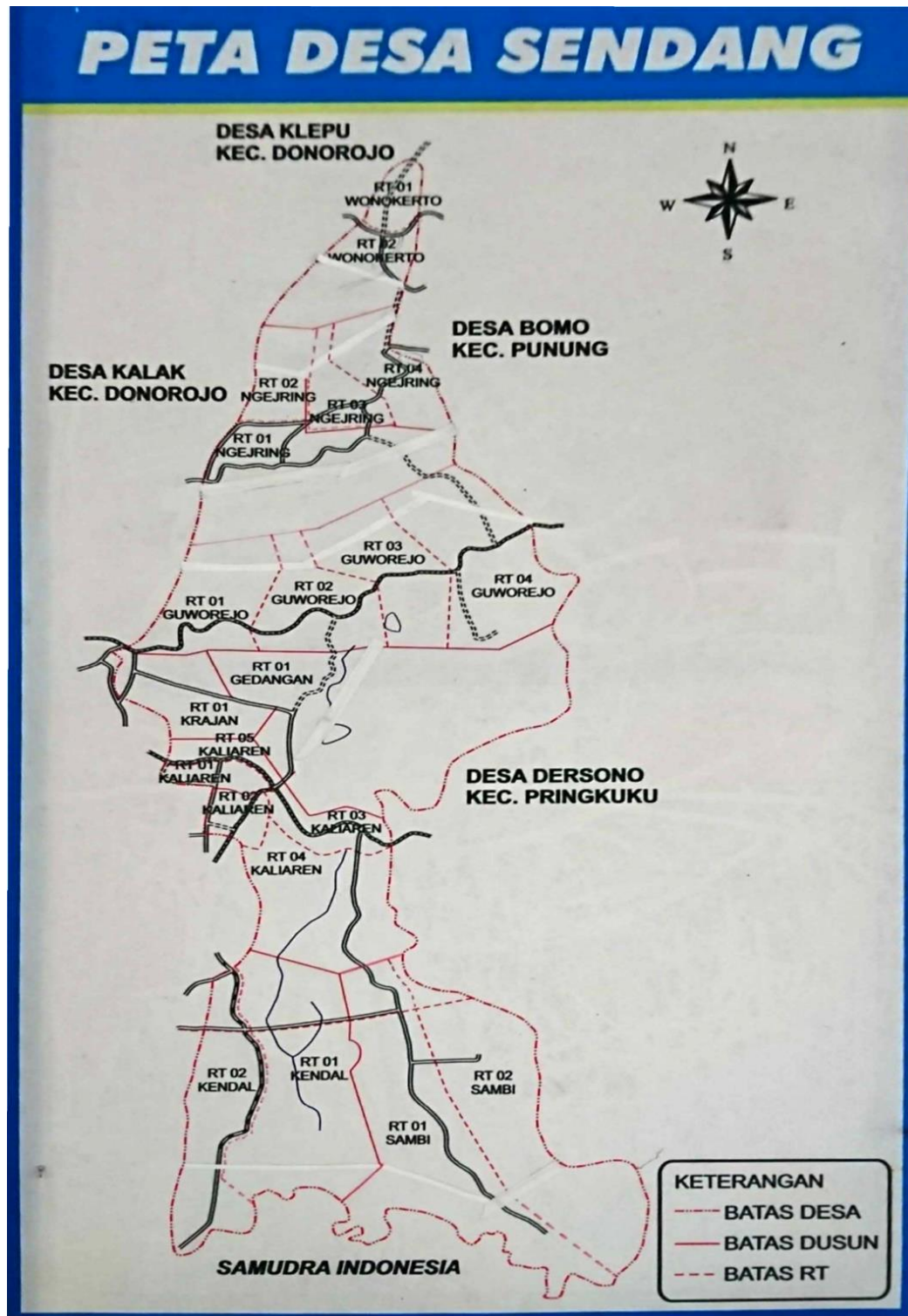
KEPALA DESA SENDANG



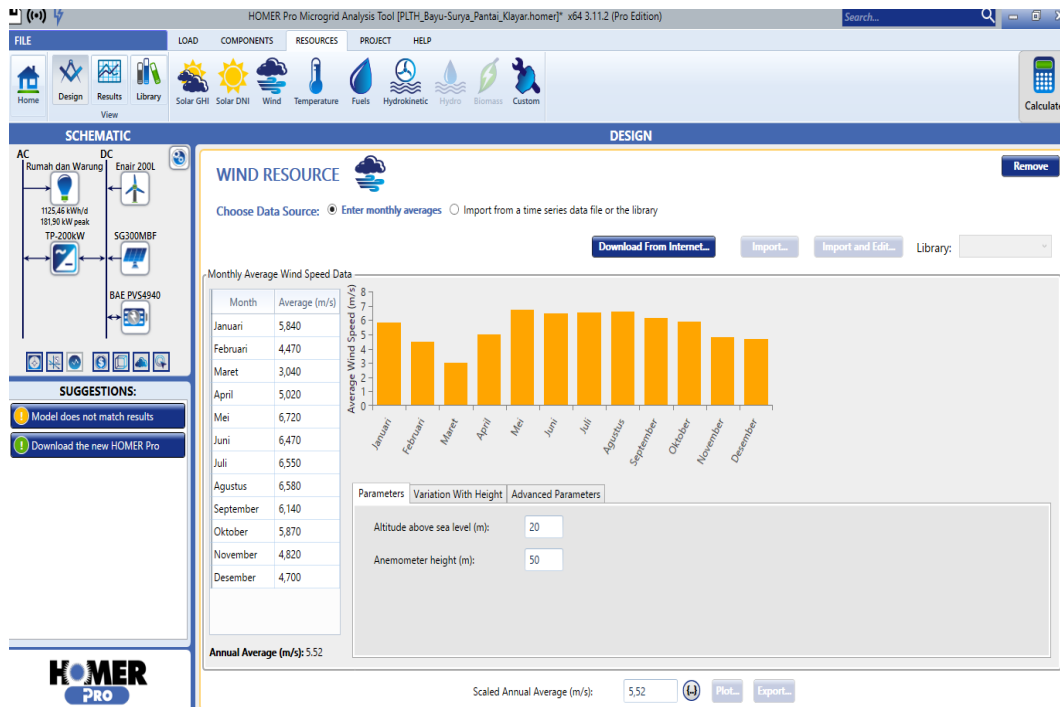
WINARTO, S.I.P.

Lampiran 2. Data Geografi

1. Peta Desa Sendang, Kecamatan Donorojo, Kabupaten Pacitan, Provinsi Jawa Timur.



2. Data Laju Angin Desa Sendang, Kecamatan Donorojo, Kabupaten Pacitan, Provinsi Jawa Timur.



3. Data Iradiasi Matahari Desa Sendang, Kecamatan Donorojo, Kabupaten Pacitan, Provinsi Jawa Timur



Lampiran 3. Data Konsumsi Energi

1. Rumah Tangga

No.	Waktu	Peralatan (W)												Jumlah (W)		
		KA-1	KA-2	K	L1-1	L1-2	L1-3	L2-1	L2-2	L2-3	MC	PN	S	T	1	140
1	00.00 - 01.00	55	55	90	0	0	0	0	0	23	0	0	0	0	223	31.220
2	01.00 - 02.00	55	55	90	0	0	0	0	0	23	0	0	0	0	223	31.220
3	02.00 - 03.00	55	55	90	0	0	0	0	0	23	0	0	0	0	223	31.220
4	03.00 - 04.00	55	55	90	0	0	0	0	0	23	0	0	0	0	223	31.220
5	04.00 - 05.00	0	0	90	14	14	14	0	0	23	0	0	0	0	155	21.700
6	05.00 - 06.00	0	0	90	14	14	14	0	0	0	0	400	0	35	567	79.380
7	06.00 - 07.00	0	0	90	0	0	0	0	0	0	0	0	0	35	125	17.500
8	07.00 - 08.00	0	0	90	0	0	0	0	0	0	0	0	0	0	90	12.600
9	08.00 - 09.00	0	0	90	0	0	0	0	0	0	360	0	0	0	450	63.000
10	09.00 - 10.00	0	0	90	0	0	0	0	0	0	0	0	0	0	90	12.600
11	10.00 - 11.00	55	0	90	0	0	0	0	0	0	0	350	35	530	74.200	
12	11.00 - 12.00	55	0	90	0	0	0	0	0	0	0	0	0	35	180	25.200
13	12.00 - 13.00	55	0	90	0	0	0	0	0	0	0	0	0	35	180	25.200
14	13.00 - 14.00	55	0	90	0	0	0	0	0	0	0	0	0	35	180	25.200
15	14.00 - 15.00	55	0	90	0	0	0	0	0	0	0	0	0	35	180	25.200
16	15.00 - 16.00	55	0	90	0	0	0	0	0	0	0	0	0	35	180	25.200
17	16.00 - 17.00	0	0	90	0	0	0	0	0	0	0	0	0	0	90	12.600
18	17.00 - 18.00	0	0	90	0	0	0	0	0	0	0	0	0	0	90	12.600
19	18.00 - 19.00	55	55	90	14	14	14	23	23	23	0	400	0	0	711	99.540
20	19.00 - 20.00	55	55	90	14	14	14	23	23	23	0	0	0	35	346	48.440
21	20.00 - 21.00	55	55	90	14	14	14	23	23	23	0	0	0	35	346	48.440
22	21.00 - 22.00	55	55	90	14	14	14	23	23	23	0	0	0	35	346	48.440
23	22.00 - 23.00	55	55	90	14	14	14	0	0	23	0	0	0	0	265	37.100
24	23.00 - 24.00	55	55	90	0	0	0	0	0	23	0	0	0	0	223	31.220
Total (W)		880	550	2.160	98	98	98	92	92	253	360	800	350	385	6.216	870.240

Keterangan:
KA = Kipas Angin
K = Kulkas
L = Lampu
MC = Mesin Cuci
PN = Penanak Nasi
S = Setrika
T = Televisi

2. Warung Kuliner

No.	Waktu	Peralatan (W)				Jumlah (W)	
		KA	K	L	PN	1	75
1	00.00 - 01.00	0	90	14	0	104	7.800
2	01.00 - 02.00	0	90	14	0	104	7.800
3	02.00 - 03.00	0	90	14	0	104	7.800
4	03.00 - 04.00	0	90	14	0	104	7.800
5	04.00 - 05.00	0	90	14	0	104	7.800
6	05.00 - 06.00	0	90	14	0	104	7.800
7	06.00 - 07.00	0	90	0	400	490	36.750
8	07.00 - 08.00	0	90	0	0	90	6.750
9	08.00 - 09.00	0	90	0	0	90	6.750
10	09.00 - 10.00	0	90	0	0	90	6.750
11	10.00 - 11.00	0	90	0	0	90	6.750
12	11.00 - 12.00	55	90	0	400	545	40.875
13	12.00 - 13.00	55	90	0	0	145	10.875
14	13.00 - 14.00	55	90	0	0	145	10.875
15	14.00 - 15.00	55	90	0	0	145	10.875
16	15.00 - 16.00	55	90	0	0	145	10.875
17	16.00 - 17.00	0	90	0	0	90	6.750
18	17.00 - 18.00	0	90	0	0	90	6.750
19	18.00 - 19.00	0	90	14	0	104	7.800
20	19.00 - 20.00	0	90	14	0	104	7.800
21	20.00 - 21.00	0	90	14	0	104	7.800
22	21.00 - 22.00	0	90	14	0	104	7.800
23	22.00 - 23.00	0	90	14	0	104	7.800
24	23.00 - 24.00	0	90	14	0	104	7.800
Total (W)		275	2.160	168	800	3.403	255.225

Keterangan:
KA = Kipas Angin
K = Kulkas
L = Lampu
PN = Penanak Nasi

3. Rumah Tangga dan Warung Kuliner

No.	Waktu	Jumlah (W)		
		RT	WK	Gabungan
1	00.00 - 01.00	31.220	7.800	39.020
2	01.00 - 02.00	31.220	7.800	39.020
3	02.00 - 03.00	31.220	7.800	39.020
4	03.00 - 04.00	31.220	7.800	39.020
5	04.00 - 05.00	21.700	7.800	29.500
6	05.00 - 06.00	79.380	7.800	87.180
7	06.00 - 07.00	17.500	36.750	54.250
8	07.00 - 08.00	12.600	6.750	19.350
9	08.00 - 09.00	63.000	6.750	69.750
10	09.00 - 10.00	12.600	6.750	19.350
11	10.00 - 11.00	74.200	6.750	80.950
12	11.00 - 12.00	25.200	40.875	66.075
13	12.00 - 13.00	25.200	10.875	36.075
14	13.00 - 14.00	25.200	10.875	36.075
15	14.00 - 15.00	25.200	10.875	36.075
16	15.00 - 16.00	25.200	10.875	36.075
17	16.00 - 17.00	12.600	6.750	19.350
18	17.00 - 18.00	12.600	6.750	19.350
19	18.00 - 19.00	99.540	7.800	107.340
20	19.00 - 20.00	48.440	7.800	56.240
21	20.00 - 21.00	48.440	7.800	56.240
22	21.00 - 22.00	48.440	7.800	56.240
23	22.00 - 23.00	37.100	7.800	44.900
24	23.00 - 24.00	31.220	7.800	39.020
Total (W)		870.240	255.225	1.125.465
Ketrangan:				
RT = Rumah Tangga				
WK = Warung Kuliner				

Lampiran 4. Harga Komponen

1. Harga Turbin Angin

enair

CONSULTANCY SMALL WIND TURBINES INSTALLATIONS TOOLS NEWS COMPANY PRICES

Wind turbine E200

The wind turbine E200, is designed to meet the energy demands of small industries such as farms, greenhouses, warehouses, etc. Its generation and design efficiency allows us to supply high power three-phase installations producing more than 200kWh/day at 6 or 7m/s.

Cp=0.48
One of the highest coefficients in the market. Discover what is produced in our Wind Atlas.

BASE PRICE
Wind turbine Enair E200 **58750€**
Including Torre, tow, inverter and control systems

Characteristics
Icons representing: Sound, Wind, Inverter, Water, Gear, and Battery.

DOCUMENTATION
Data sheet, Certification, Manual, Schemes, and Info.

OPTIONS
Remote management **+ 1000€**
Remote management and optimization system for 1 year.
4m Extension **+ 3200€**

Calculate the price of your installation
GO TO THE CONFIGURATOR

2. Harga Panel Surya

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How Much Do I Need?
Solar Permit Design

SOLAR KITS by Kilowatt Size
Panels IN STOCK
Panels by Brand
Panels by Watt

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Grid-Tied Inverter Guide
Micro-Inverter Guide
String vs Micro Inverters?

Battery Storage
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Monitoring Systems

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Energy Calculator
How Solar Works
Loans
Leasing, PPA
Rebates, Tax Credits
Installer Reviews
Power Blog
Learning Center

Off-grid, Backup Power
Kits + Battery Backup
Off-Grid
Camping, Backpacking
Portable Chargers
Lights, Lamps
Skylights
Radios
RV, Marine Kits
Generators
Fans, Vents
Home & Garden
Disney Solar Lights

Home > SOLAR PANELS > by Watt > 300 watts >

300 watt Solar Panel Peimar Mono black

Your Price: \$170.00
Watts 300
Cost per Watt (after tax credit) \$0.54
NOTE: ONLY 5 LEFT
Shipping via Freight Required
(Minimum order): 27

SOLD OUT
+ Add To Wish List

Availability: SOLD OUT
Product Code: SG300M

DESCRIPTION | **SPECIFICATIONS**

- Manufacturer: Peimar
- Model: SG300M
- Maximum Power STC: 300 watts DC
- Maximum Power PTC: 269.7 watts DC
- Nominal Power NOCT: 223.8 watts DC
- Module Efficiency: 18.33%
- Maximum Power Voltage Vmp (V): 32.0V
- Maximum Power Current Imp (A): 9.4 Amps
- Open Circuit Voltage Voc (V): 39.8V
- Short Circuit Current Isc (A): 9.93 Amps
- Maximum system voltage (UL): 1000V
- Maximum series fuse rating: 15A
- Cells per module: 60
- Cell Type: Monocrystalline
- Frame: Anodized Aluminum Alloy, black frame
- Glass: 3.2 mm thick, low iron tempered, Anti-reflective glass
- Dimensions: 64.5 x 39 x 1.57 inches (1640 x 992 x 40 mm)
- Weight: 39.7 lbs
- Connector Type: MC4 compatible
- Output cables: 35.43 inches
- Junction Box: IP65 Rated
- Product Warranty: 20 year material and workmanship
- Performance Warranty: 30 year linear power output warranty
- Fire Safety Classification: Class C
- Certifications: UL, CEC, FSEC
- Operating Temperature Range: -40F to +185F
- Nominal Operating Cell Temperature NOCT: 113 degrees F +/- 2 degrees
- Front Load (snow) Test: 5400Pa
- Rear static load (wind) test: 2400Pa
- Hailstone impact test: 1 inch hail at 23M/s from 1m distance
- Modules per Pallet: 27
- Pallet Weight: 1,140 lbs
- Pallet Dimensions: 67" x 43" x 47"

3. Harga Baterai

More info at: 0040751100373

LEU EUR USD

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search product Search

In cart: 0 products
Total: 0 lei

HOME DISCOUNTED PRODUCTS SERVICES EVENTS GALLERY TERMS AND CONDITIONS VIEW PARAMETERS CONTACT

Ask for an estimate!
Fill the form and get a personalised estimate!

Warning: mysqli_fetch_array() expects parameter 1 to be mysqli_result, boolean given in /home/esolare2/public_html/utills/helper.inc on line 521

BAE Secura 26 PVS 4940

In stock

www.e-solare.com

petawatt.energia@gmail.com 0040751100373

Brand: BAE Batterien

4342.59 lei
With VAT: 5167.68

1 ADD TO CART

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Pentru informatii suplimentare accesati fisa tehnica de mai jos:

PRODUCTS

- + "BUDGET" PREWIRED SOLAR KITS
- Solar panels (pallet price) - 0,29 euro/watt
- + Photovoltaic panels (price/piece)
- + Deep Cycle batteries Solar Photovoltaic
- + Inverters Off-Grid
- + On-grid inverters
- + Chargere Baterii Samlex 12/24V - 230V
- + Controllers(Regulators) Solar
- + Photovoltaics Aluminum Structures
- + Pachete Solare Fotovoltaice Off-Grid

4. Harga Inverter

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200KW Off-grid Intelligent Three-phase Power-frequency Solar Power System Solar Inverter for Large Data Center

FOB Reference Price: [Get Latest Price](#)

>=1 Pieces

\$16,591.00

Lead Time:

Quantity(Pieces)	1 - 1	>1
Est. Time(days)	10	Negotiable

Contact Supplier

Leave Messages

Payments: [VISA](#) [Master](#) [TT](#) [Online Bank Payment](#) [Pay Later](#) More

Shipping: Alibaba.com Ocean Shipping Service from China to U.S [Get shipping quote](#)

Season New Energy Co., Ltd.

2YRS CN

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Product Details Company Profile Report Suspicious Activity

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Lampiran 5. Spesifikasi Komponen

1. Spesifikasi Turbin Angin

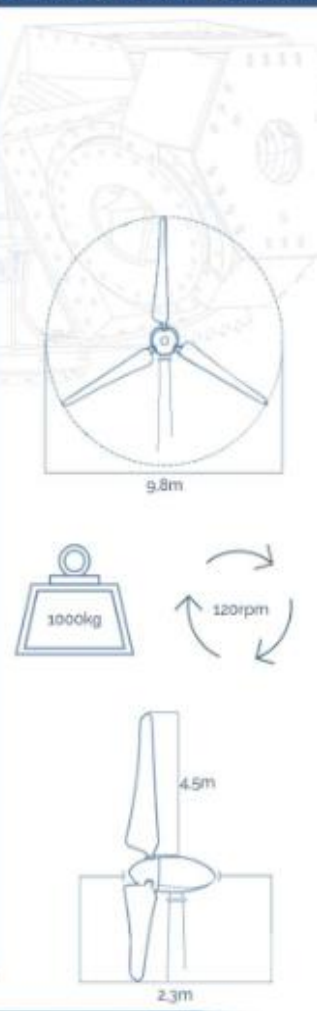


E200L DATA SHEET

Our patented technology is an intelligent adaptation of the main systems which big turbines have to small turbines from 10 to 60kW. High security, maximum control and the best efficiency in power generation

CARACTERÍSTICAS TÉCNICAS, ELÉCTRICAS Y DE FUNCIONAMIENTO

GENERATOR	Power	20kW
	Configuration	3 phases - 500V - Direct drive
TURBINE	Configuration	3 blades, horizontal axis, upwind
	Rated power	10kW - IEC 61400, software limited
	Applications	Direct grid tied - Micro grids
	Rotor speed	120rpm
	Start rotation	1.85m/s
	Cut production	30m/s
	Protection	Ip-65/Sand and hight protection
	Weight	1000kg
ROTOR	Yaw	Aerodynamic downwind orientation
	Diameter	9.8m
	Swept area	75.4m ²
	Blade lenght	4.5m
	Blade material	Fiberglass, flex resins and plyurethane
BRAKE SAFETY SYSTEM	Regulation speed	Active pitch, electronical regulation and brake
	Pitch	Variable pitch with active control By wind and power
	Brake	Electromechanical safety brake
TURBINE CONTROL	Electronic control of	- Wind speed - Temperature (opc.) - Voltage - Grid failure - Sensors failure
	Electronic System	Programmable system to adapt the turbine Register alarms
INVERTER	Software	Customizable software. General screen of key parameters.
	Solar Inverter	Compatible with solar inverters of constant voltage at 500V



9.8m

1000kg

120rpm

4.5m

2.3m

www.enair.es

Avenida de Ibi, 44 - P.O. 182 C.P. 03420 | Castalla (Alicante), España
+34 96 556 00 18 info@enair.es



E200L Wind Turbine DATA SHEET

THE HIGHEST TECHNOLOGY IN SMALL WIND TURBINES

Service Life
25 years!!

CLASS I WIND TURBINE
IEC 61400-2/NVI-A

ACTIVE PITCH CONTROL

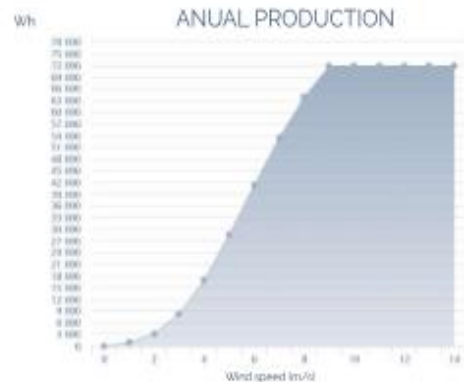


Patented technology
Characteristics:
 - Sturdiness
 - High endurance
 - Full angle pitch control
 - Spring passive security, if any fault
 - Hydraulic control
 Scalable technology from 5 to 100kW of power
 - Simple
 - Very secure and fully controlled

ELECTRONIC CONTROL



Multi-program functions
 Full control of
 - rpm - Nm
 - Hz - V AC/DC voltage
 - m/s
 Reads all the turbine parameters, which let you decide the best actions in external controls to optimize your production and security
 The software enables different types of behaviours depending on the wind conditions to increase the efficiency



ACTIVE PITCH AND PASSIVE PROTECTION

The active pitch control enables the position of the blade for production to vary for each engine rotation speed and wind speed from the beginning up to high wind speed.
 The benefits of mechanical simplicity and advanced electronics are combined to make a perfect tandem and maximize energy production.

THE CFD AND AERODYNAMIC DESIGNS

For the full wind turbine design it has been done a complex aerodynamic study based on the most modern techniques of computational fluid dynamics.
 In this case, the studies required a very high computing capacity and expert knowledge because the conditions are complex due to the wind turbines operation conditions.

MONITORING SYSTEM

To say that our product is the best, it is necessary to prove it, so we have chosen to provide a complete monitoring system of various parameters of the wind turbine to left the user to check the production and it condition, even from the Internet, without being on site
 ** This system is optional and customizable in several levels.

* The technical specifications described in the document are subject to modifications / changes without prior notice from the manufacturer. ** The images that appear in this document are not contractual.


- Silent**
 The aerodynamic profile of the blades is based in the FX pole series, and its design is for maximize production and minimize noise.
- Efficiency**
 The control system allows to extract the power maximum available since the start of rotation and can adapt to any environment.
- Greater safety than ever**
 3 security systems, active and passive: electromechanical active brake, aerodynamic and passive dock, which act in any condition.
- Waterproof**
 The materials used are made with a tropicalization treatment to install in islands, deserts or aggressive environments.
- High endurance**
 According to IEC (based on the design of the wind turbine is classified as Class I, with safety factors in the critical components of an FS - 9.



Ibi Avenue, 44 - PO. 182 C.P. 03420 | Castalla (Alicante), Spain
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www.enair.es

2. Spesifikasi Panel Surya



PEIMAR
ITALIAN PHOTOVOLTAIC MODULES

PERC TECHNOLOGY*
Passivated Emitter and Rear Cell

30 YEAR LINEAR POWER WARRANTY
ANNI GARANZIA LINEARE PRODUZIONE

20 YEAR PRODUCT WARRANTY
ANNI GARANZIA PRODOTTO

FULL BLACK LINE

SG290/300M (FB)

 "MADE IN ITALY" MODULE

PEIMAR monocrystalline solar panels, produced using a combination of innovative production processes and advanced engineering techniques, provide customers with maximum output and super high performance (over 20% efficiency). This allows fewer panels to be used to generate more energy, ideal if space is restricted or environmental conditions are challenging. Modern design, using matching black cells, backsheet and frames and a very long lifespan ensure this monocrystalline are a great option.

*Thanks to the use of PERC cells, PEIMAR modules are able to reach even higher efficiencies, as they facilitate the light imprisonment in close proximity to the rear surface and optimise the electron capture.

 POSITIVE POWER OUTPUT TOLERANCE

 MODULE FIRE PERFORMANCE: CLASS I

 ANTI-REFLECTIVE GLASS

 HAILSTORM RESISTANCE

CELLS

60
MONO



QTE:
60 CELLS
TYPE:
MONO 500
PERC TECHNOLOGY 
DIMENSION:
156x156 mm / 6in"

FRAME



BACKSHEET



JUNCTION BOX



FULL BLACK LINE

ELECTRICAL CHARACTERISTICS (STC)*

	SG200M (FB)	SG300M (FB)
Nominal Output (Pmax)	200 W	300 W
Rush Test Power Tolerance	0±5 W	0±5 W
Voltage at Pmax (Vmp)	31.6 V	32 V
Current at Pmax (Imp)	9.18 A	9.4 A
Open Circuit Voltage (Voc)	39.5 V	40.2 V
Short Circuit Current (Isc)	9.30 A	9.71 A
Maximum System Voltage	1500 V	1500 V
Maximum Series Fuse Rating	15 A	15 A
Module Efficiency	17.83%	18.44%

MECHANICAL CHARACTERISTICS

Solar Cells	60 (6x10) monocrystalline PERC
Solar Cells Size	156x156 mm / 6x6"
Front Cover	3.2 mm / 0.12" thick, low iron tempered glass
Back Cover	TPV (Toluol-PEI-Isolar)
Encapsulant	EW (Ethylene vinyl acetate)
Frame	Anodized aluminum alloy, double wall
Frame Finishing	Black
Backsheet Finishing	Black
Diode	3 Diodes / diode, convertible
Junction Box	IP67 rated
Connector	MCA or compatible connector
Cables Length	900 mm / 36.4"
Cables Section	4.0 mm ² / 0.006 in ²
Dimensions	1640x992x40 mm / 64.5x39.1x1.57"
Weight	18 Kg / 39.7 lbs
Max. Load	Certified to 5400 Pa

TEMPERATURE CHARACTERISTICS

NOCT**	45±2 °C
Temperature Coefficient of Pmax	-0.42 %/°C
Temperature Coefficient of Voc	-0.32 %/°C
Temperature Coefficient of Isc	0.047 %/°C
Operating Temperature	40 °C - -85°C

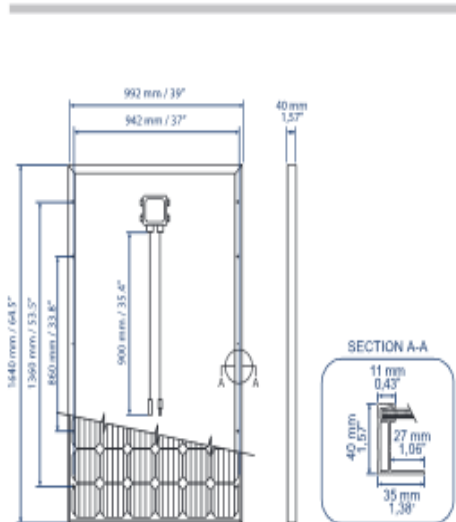
PACKAGING***

Pallet dimensions	1700x1200x1200 mm / 67x47x47"
Pieces per pallet	27
Weight	516 Kg / 1138 lbs

CERTIFICATIONS

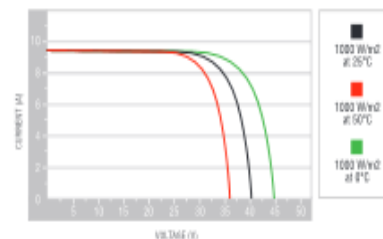
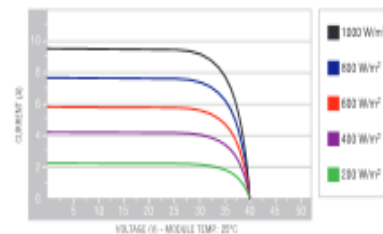
Fire Resistance Rating	Class C (for UL9500 C1703 01)
Module Em performance	Type I (for UL 1703)

DIMENSIONS



CURRENT/VOLTAGE CHARACTERISTICS

Values apply to modules: SG300M (FB)



*STC: (Standard Test Condition) Irradiance 1000W/m², Module Temperature 25°C, Air Mass 1.5

**NOCT: (Nominal Operation Cell Temperature) Sun 800W/m², Air 20°C, Wind speed 1m/s

***Pallets can be stacked up to two

It is important to point out, that all technical specifications, information and figures contained in this datasheet are estimated values. Peimar reserves the right to change the technical specifications, information and figures contained in this document at any time without notice. US, NREL 1_800008

available at: SolarPanelStore.com

PEIMAR
ITALIAN PHOTOVOLTAIC MODULES

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3. Spesifikasi Baterai

BAE SECURA PVS solar

Technical Specification for Vented Lead-Acid Batteries (VLA)

1. Application

BAE SECURA PVS solar batteries need only low maintenance and are used to store electric energy in medium and large solar photovoltaic installations.

Due to the robust tubular plate design BAE PVS batteries are excellent suited for highest requirements regarding cycling ability and long lifetime.



2. Technical data (Reference temperature 20 °C)

Type	C_{1h} Ah	C_{10h} Ah	C_{20h} Ah	C_{25h} Ah	C_{30h} Ah	C_{40h} Ah	C_{50h} Ah	R_i mΩ	I_s kA	Length (L) mm	Width (W) mm	Height (H) mm	Weight dry kg	Weight filled kg
2 PVS 140	63	111	127	141	143	144	148	1.52	1.37	105	208	420	9.1	14.5
3 PVS 210	95	167	191	211	215	217	222	1.06	1.96	105	208	420	11.2	16.4
4 PVS 280	127	223	254	282	287	289	295	0.84	2.46	105	208	420	12.8	18.0
5 PVS 350	159	279	318	352	359	361	369	0.70	2.98	126	208	420	15.3	21.7
6 PVS 420	191	334	382	424	431	434	444	0.60	3.47	147	208	420	18.1	25.7
5 PVS 550	223	389	432	486	496	500	513	0.57	3.61	126	208	535	20.0	28.8
6 PVS 660	267	467	518	583	595	601	616	0.49	4.18	147	208	535	23.5	34.0
7 PVS 770	310	544	604	681	694	700	720	0.44	4.69	168	208	535	26.8	39.1
6 PVS 900	352	665	748	856	877	888	916	0.47	4.41	147	208	710	33.0	47.4
7 PVS 1050	415	777	872	993	1,020	1,033	1,065	0.36	5.66	215	193	710	42.1	61.5
8 PVS 1200	473	886	996	1,137	1,160	1,178	1,216	0.32	6.36	215	193	710	46.6	65.4
9 PVS 1350	522	992	1,116	1,274	1,300	1,320	1,365	0.33	6.20	215	235	710	51.4	75.4
10 PVS 1500	585	1,100	1,240	1,418	1,450	1,464	1,516	0.28	7.25	215	235	710	56.0	79.4
11 PVS 1650	635	1,210	1,362	1,555	1,590	1,608	1,665	0.28	7.36	215	277	710	61.0	89.6
12 PVS 1800	698	1,320	1,486	1,699	1,740	1,752	1,816	0.24	8.41	215	277	710	65.4	93.4
11 PVS 2090	790	1,470	1,636	1,836	1,870	1,884	1,941	0.24	8.38	215	277	855	72.7	105.9
12 PVS 2280	869	1,600	1,784	2,001	2,040	2,052	2,116	0.22	9.48	215	277	855	77.4	110.4
13 PVS 2470	978	1,740	1,938	2,174	2,210	2,222	2,292	0.16	13.03	215	400	815	90.8	137.8
14 PVS 2660	1,051	1,880	2,080	2,332	2,380	2,400	2,448	0.15	13.82	215	400	815	95.3	142.4
15 PVS 2850	1,123	2,010	2,220	2,488	2,550	2,568	2,640	0.14	14.43	215	400	815	100.2	146.9
16 PVS 3040	1,195	2,140	2,360	2,664	2,710	2,736	2,808	0.13	15.20	215	400	815	105.4	151.6
17 PVS 3230	1,280	2,290	2,540	2,858	2,910	2,940	3,000	0.12	16.91	215	490	815	117.7	175.1
18 PVS 3420	1,352	2,420	2,680	3,024	3,080	3,108	3,192	0.11	17.55	215	490	815	121.9	179.1
19 PVS 3610	1,425	2,560	2,840	3,189	3,250	3,276	3,360	0.11	18.36	215	490	815	126.8	183.6
20 PVS 3800	1,496	2,690	2,980	3,355	3,420	3,444	3,528	0.11	18.92	215	490	815	132.0	188.3
22 PVS 4180	1,635	2,950	3,280	3,686	3,750	3,780	3,888	0.10	19.92	215	580	815	145.4	213.9
24 PVS 4560	1,777	3,220	3,560	4,010	4,090	4,128	4,224	0.09	21.25	215	580	815	155.2	223.0
26 PVS 4940	1,917	3,480	3,860	4,341	4,420	4,464	4,584	0.09	22.49	215	580	815	165.0	232.0

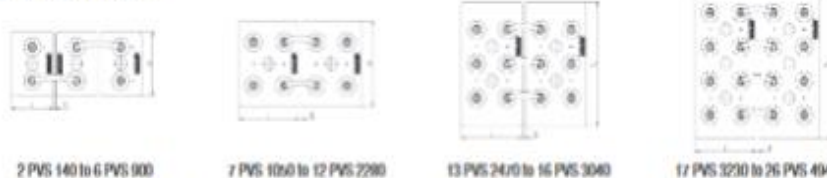
1, 2) Internal resistance R_i and short circuit current I_s according to IEC 60896-11

Height (H) is the maximum height between container bottom and top of the bolts in assembled condition.

BAE SECURA PVS solar batteries are also available as dry pre-charged version. They are filled with additional "1G", e.g. 4 PVS 280 1G.

All values given in the table correspond to 100 % DOD without voltage drop of connectors. Please consider item 7.

3. Terminal positions



Terminals are designed as female poles with brass inlay M10 for flexible insulated copper cables with cross-section 25, 35, 50, 70, 95 or 120 mm² or insulated solid copper connectors with cross-section 90, 150 or 300 mm².



Technical Specification for BAE *SECURA PVS solar*



4. Design

Positive electrode	tubular-plate with a woven polyester gauntlet and solid grids in a corrosion-resistant PbSbSnSe-low antimony alloy
Negative electrode	grid-plate in a low antimony alloy with long-life expander material
Separation	microporous separator
Electrolyte	sulphuric acid with a density of 1.24 kg/l at 20 °C (68 °F)
Container	high impact, transparent SAN (Styrol-Acrylic-Nitril), UL-94 rating: HB
Lid	high impact SAN in dark grey colour (colour may vary slightly from given image), UL-94 rating: HB
Plugs	labyrinth plugs for arresting aerosols, optional ceramic plugs or ceramic funnel plugs according to DIN 40740
Pole-bushing	100 % gas- and electrolyte-tight, sliding, plastic-coated "Panzerpol"
Kind of protection	IP 25 regarding EN 60529, touch protected according to VBG 4

5. Installation

BAE *SECURA PVS solar* batteries are designed for indoor applications. For outdoor applications please contact BAE.

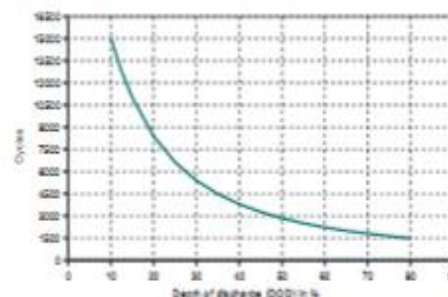
6. Maintenance

Every 6 months	check battery voltage, pilot cell voltages, temperatures
Every 12 months	check connections, record battery voltage, cell voltages and temperatures
Every 3 years	average water-refilling interval (depending on utilization and ambient temperature)

7. Operational data

Depth of discharge (DOD)	max. 80 % ($U_n = 1.91$ V/cell for discharge times >10 h; 1.74 V/cell for 1 h) deep discharges of more than 80 % DOD have to be avoided unlimited, the minimal charge current has to be 5 A/100 Ah C_{10}
Initial charge current (1 or bulk phase)	restricted from 2.30 V to 2.40 V per cell, operating instruction is to be observed 2.23 V/cell
Charge voltage at cyclic operation	restricted from 2.30 V to 2.40 V per cell, operating instruction is to be observed
Float voltage/non cyclic voltage	2.23 V/cell
Adjustment of charge voltage	no adjustment necessary if battery temperature is between 10 °C and 30 °C (50 °F and 86 °F) in the monthly average, otherwise $\Delta U/\Delta T = -0.003$ V/cell per K within a period of 1 up to 4 weeks
Recharge to 100 % IEC 61427 cycles	3,150 (A+B) at 40 °C (104 °F)
Battery temperature	-20 °C to 55 °C (-4 °F to 131 °F), recommended temperature range 10 °C to 30 °C (50 °F to 86 °F)
Self-discharge	approx. 3 % per month at 20 °C (68 °F)

8. Number of cycles as function of Depth of discharge



9. Transport

Batteries are not subject to ADR (road transport), if the conditions of Special Provision 598 (Chapter 3.3) are observed. These cells/batteries are dangerous goods on sea transport. Declaration and packaging must comply with the requirements of IMDG-Codes.

10. Standards

Test standards	IEC 60896-11, IEC 61427
Safety standard, ventilation	EN 50272-2

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 **BAE**
Energy from Batteries

4. Spesifikasi Inverter

Product Description Product Recommended Certifications Our advantage Company Information Pr

Rated capacity	10kW	20kW	30kW	40kW	60kW	80kW	100kW	150kW	200kW
Operation mode and principle	PWN (pulse width modulation)based on DSP accurate control technology and double built-in MCUs complete isolation of the output power supply								
AC input phase number	three-phase + N+G								
AC input voltage	AC 220V/AC 382V±20%								
AC input frequency	50hz/60hz±5%								
DC voltage	DC 192V/DC 220V/DC 240V/DC 384V(16 to 32 pieces of 12V batteries)								
Floating battery	13.6V of each battery*battery quantity (13.6V*16 batteries=217.6)								
Cut-off voltage	10.8v of each battery *battery quantity (10.8V*16 batteries=172.8V)								
Phase number	three-phase +N+G								
AC output voltage	AC 220V/AC 380V±1% (steady load)								
AC output frequency	50hz/60hz±5% (main supply) 50hz±0.01%								
Efficiency	≥95% (load:100%)								
output waveform	sine wave								
THD	linear load:<3%.non-linear load:<5%								
Dynamic load voltage transient	<±5%(jump from 0 to 100%)								
Instant recovery time	<10ms								
time of switching between the battery and the mains supply	3s-5s								
Unbalanced voltage	<±3% <±1% (balanced load voltage))								
Overload capacity	120%,20s;>150%,100ms								
Operation efficiency	≥95% (load: 100%)								
Computer communication interface	RS232/RS485(SNMP remote monitoring network adapter)								
Operating temperature	-10-40°C								
Relative humidity	0-90% (no condensation)								
Noise	40-50dB			50-60dB			60-70dB		