



**RISUN  
GREEN ENERGY**

**SOLAR  
ENERGY**



公  
OUR COMPANY PANORAMA

INTELLIGENT MANUFACTURING

SMART MICROGRID

## BUSINESS NETWORK+OUR CUSTOMERS



**江西瑞安新能源有限公司**  
JIANGXI RISUN GREEN ENERGY CO.,LTD.

**江西瑞晶太阳能科技有限公司**  
JIANGXI RISUN SOLAR ENERGY CO.,LTD.

总公司地址(Add)::中国江西省新余市渝水区新兴工业园大一路

No. 22 Dayi Road, xiacun Industrial Park, Yushui District, Xinyu, Jiangxi, China

总机(Tel):+86 790 685 8888 传真(Fax):+86 790 685 2888 邮编(P.C.):338019 网址:http://www.risunsolar.com

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加盟 国内电话:0790-685 2829 / 685 2880 / 685 2678 电子信箱:sc@risunsolar.com 省内电话:0790-685 2600

Overseas Business:+86 790 685 2826 / 685 2886 / 685 2825 E-mail:gjs@risunsolar.com

India office: Risun Green Private Limited

Add: 4/14, Twinkle star Chs Ltd, Ghatla Road, Chembur, Mumbai City, Maharashtra, 400071

Thailand office: Risun (Thailand) Co.,LTDR

Add: amkhamhaeng Road - Soi Ramkhamhaeng , 24/3 Khwaeng Hua Mak, Khet Bang Kapi, Krung Thep Maha Nakhon 10240 , Bangkok, Thailand

Germany office: RISUN GmbH

Maelzereistr. 3,90409 Nuernberg, Germany

French office: RISUN SOLAR ENERGY sas

Add: 24 rue Beranger, 75003, Paris - FRANCE

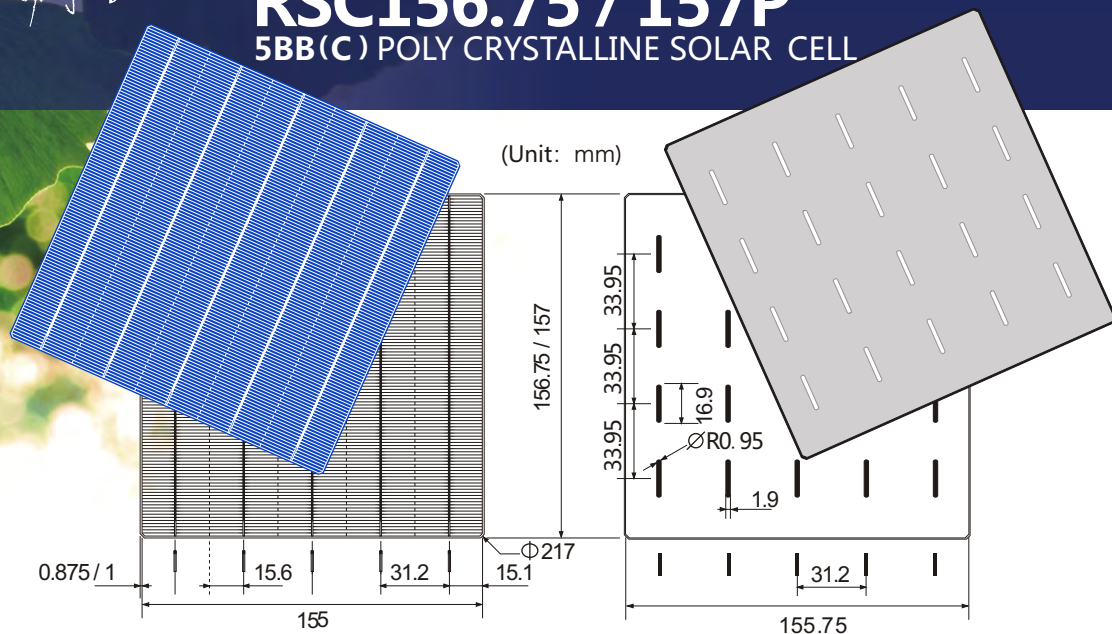
+33 (0) 673 377 108 / contact@risunsolar.fr / www.risunsolar.fr



Green Risun Grasp future

# RSC156.75 / 157P

## 5BB(C) POLY CRYSTALLINE SOLAR CELL



### FEATURES

- Ozonized PID resistant process
- Tighter color variation control<sup>①</sup>
- <1.0mm graphite boat button size<sup>②</sup>
- >1.5N peel strength for Front Ag busbar<sup>③</sup>
- >2.0N peel strength for Back Ag busbar<sup>③</sup>
- Cell bow <2.0mm

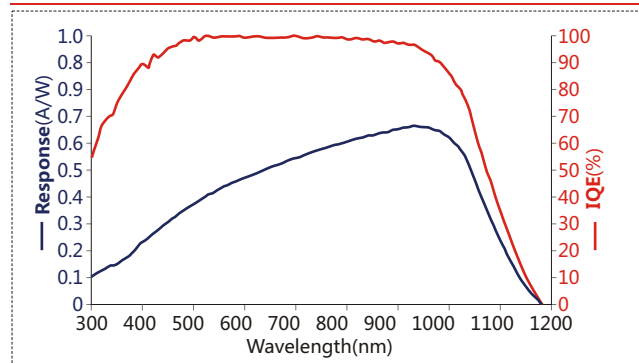
### TEMPERATURE COEFFICIENTS<sup>④</sup>

Voc (β)	-0.33% / °C
Isc (α)	+0.06% / °C
Pmp (γ)	-0.40% / °C

### MECHANICAL DATA & DESIGN

Format	156.75mm × 156.75mm / 157mm × 157mm
Thickness	180 ± 18μ
Front	0.7mm wide continuous BB SiN Blue ARC
Back	2.0mm exposed BB width Al BSF

### SPECTRAL RESPONSE, IQE AND IRRADIANCE DEPENDENCE<sup>④</sup>



Irradiance W/m <sup>2</sup>	Isc*	Voc*	Pmp*
1000	1.00	1.00	1.00
800	0.80	0.99	0.79
600	0.60	0.98	0.59
400	0.40	0.96	0.38
200	0.20	0.93	0.18

Values normalized to 1000 W/m<sup>2</sup> Irradiance

### CELL SPECIFICATION

Eff, %	Pmpp, W	Vmpp, V	Imp, A	Voc, V	Isc, A	FF, %
19.70	4.84	0.551	8.784	0.653	9.321	79.52
19.60	4.82	0.550	8.757	0.652	9.294	79.48
19.50	4.79	0.549	8.727	0.651	9.263	79.45
19.40	4.77	0.548	8.701	0.650	9.239	79.38
19.30	4.74	0.547	8.669	0.649	9.209	79.34
19.20	4.72	0.546	8.639	0.648	9.180	79.30
19.10	4.69	0.545	8.611	0.647	9.156	79.22
19.00	4.67	0.544	8.581	0.646	9.130	79.15
18.90	4.64	0.543	8.553	0.645	9.102	79.11
18.80	4.62	0.542	8.522	0.644	9.074	79.05
18.70	4.59	0.541	8.494	0.643	9.047	78.99
19.30	4.74	0.545	8.72	0.640	9.22	80.55
19.20	4.72	0.544	8.70	0.639	9.20	80.46
19.10	4.70	0.542	8.68	0.637	9.18	80.44
19.00	4.68	0.541	8.64	0.636	9.16	80.43
18.90	4.64	0.547	8.50	0.641	9.00	80.62
18.80	4.62	0.545	8.48	0.640	8.98	80.52
18.70	4.60	0.544	8.48	0.639	8.96	80.43
18.60	4.58	0.542	8.46	0.637	8.96	80.35
18.50	4.56	0.541	8.44	0.636	8.94	80.25
18.40	4.52	0.539	8.42	0.634	8.92	80.23
18.30	4.50	0.538	8.40	0.633	8.90	80.16
18.20	4.48	0.536	8.38	0.631	8.88	80.08
18.10	4.46	0.535	8.34	0.630	8.86	79.82

Measurements at Standard Test Conditions (STC), 1000W/m<sup>2</sup>, 25°C, AM1.5G Spectrum



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### International Business Department

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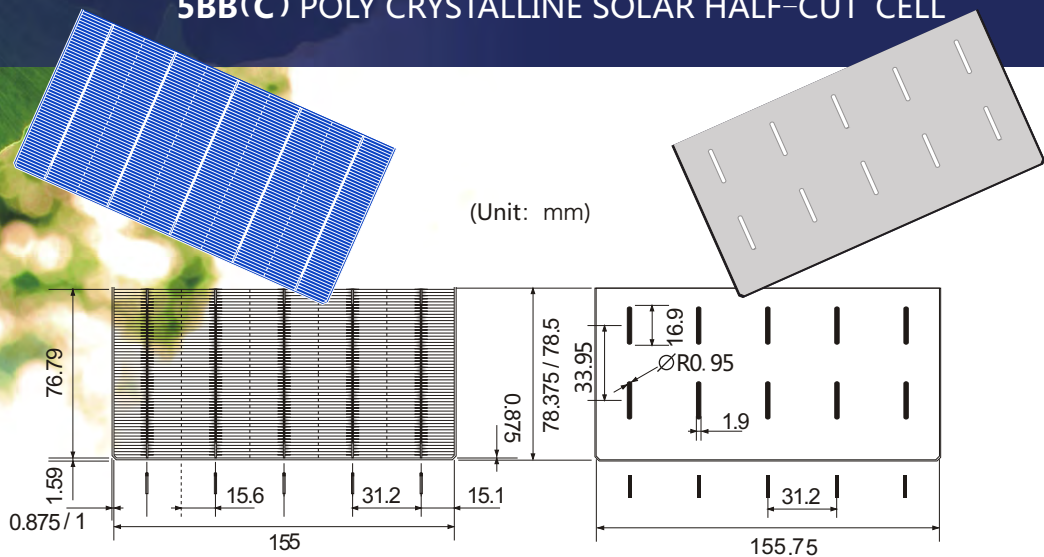
French Office: Tel: +33 673 377 108 contact@risunsolar.fr

① Ref: Risun Solar Optical Inspection Standard; Please contact sales@risunsolar.com for the document.  
 ② Graphite button mark not protruding the extreme fingers or cover fingers.  
 ③ Peel strength test referenced to 180° peel angle using Auto Tab Pull Tester.  
 ④ Temperature coefficients, Spectral response, IQE curve and Irradiance dependence measured at National Center of Supervision and Inspection on Solar PV products Quality, CPVT Testing lab, Wuxi, China.  
**Remark:** Product specifications are subject to change without notice. Risun Solar reserves the right for the final interpretation of all figures reported in this specification document.

Green Risun Grasp future

# RSHC156.75 / 157P

## 5BB(C) POLY CRYSTALLINE SOLAR HALF-CUT CELL



### FEATURES

- Ozonized PID resistant process
- Tighter color variation control<sup>①</sup>
- <1.0mm graphite boat button size<sup>②</sup>
- >1.5N peel strength for Front Ag busbar<sup>③</sup>
- >2.0N peel strength for Back Ag busbar<sup>③</sup>
- Cell bow <2.0mm

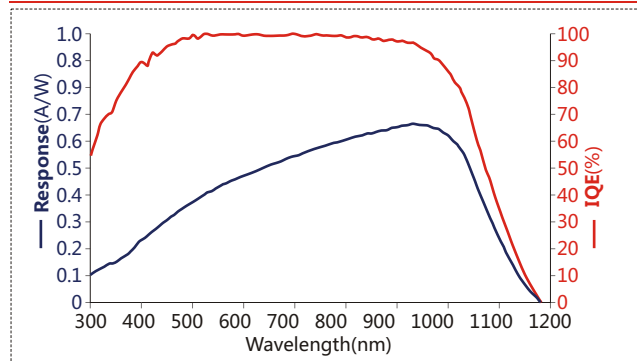
### TEMPERATURE COEFFICIENTS<sup>④</sup>

Voc ( $\beta$ )	-0.33% / °C
Isc ( $\alpha$ )	+0.06% / °C
Pmp ( $\gamma$ )	-0.40% / °C

### MECHANICAL DATA & DESIGN

Format	156.75mm × 78.375mm / 157mm × 78.5mm
Thickness	180 ± 18μ
Front	0.7mm wide continuous BB SiN Blue ARC
Back	2.0mm exposed BB width Al BSF

### SPECTRAL RESPONSE, IQE AND IRRADIANCE DEPENDENCE<sup>④</sup>



Irradiance W/m <sup>2</sup>	Isc*	Voc*	Pmp*
1000	1.00	1.00	1.00
800	0.80	0.99	0.79
600	0.60	0.98	0.59
400	0.40	0.96	0.38
200	0.20	0.93	0.18

Values normalized to 1000 W/m<sup>2</sup> Irradiance

### CELL SPECIFICATION

Eff, %	Pmpp, W	Vmpp, V	Imp, A	Voc, V	Isc, A	FF, %	
19.70	2.42	0.551	4.392	0.653	4.661	79.52	PERC
19.60	2.41	0.550	4.379	0.652	4.647	79.48	
19.50	2.40	0.549	4.364	0.651	4.632	79.45	
19.40	2.38	0.548	4.351	0.650	4.620	79.38	
19.30	2.37	0.547	4.335	0.649	4.605	79.34	
19.20	2.36	0.546	4.320	0.648	4.590	79.30	
19.10	2.35	0.545	4.306	0.647	4.578	79.22	
19.00	2.33	0.544	4.291	0.646	4.565	79.15	
18.90	2.32	0.543	4.277	0.645	4.551	79.11	
18.80	2.31	0.542	4.261	0.644	4.537	79.05	
18.70	2.30	0.541	4.247	0.643	4.524	78.99	MCCE
19.30	2.37	0.545	4.36	0.640	4.61	80.55	
19.20	2.36	0.544	4.35	0.639	4.60	80.46	
19.10	2.35	0.542	4.34	0.637	4.59	80.44	
19.00	2.34	0.541	4.32	0.636	4.58	80.43	
18.90	2.32	0.547	4.25	0.641	4.50	80.62	
18.80	2.31	0.545	4.24	0.640	4.49	80.52	
18.70	2.30	0.544	4.24	0.639	4.48	80.43	
18.60	2.29	0.542	4.23	0.637	4.48	80.35	
18.50	2.28	0.541	4.22	0.636	4.47	80.25	DW
18.40	2.26	0.539	4.21	0.634	4.46	80.23	
18.30	2.25	0.538	4.20	0.633	4.45	80.16	
18.20	2.24	0.536	4.19	0.631	4.44	80.08	
18.10	2.23	0.535	4.17	0.630	4.43	79.82	

Measurements at Standard Test Conditions (STC), 1000W/m<sup>2</sup>, 25°C, AM1.5G Spectrum



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 ④ Temperature coefficients, Spectral response, IQE curve and Irradiance dependence measured at National Center of Supervision and Inspection on Solar PV products Quality, CPVT Testing lab, Wuxi, China.  
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# RSM60(H)-156P

## 260 – 290W

Green Risun Grasp future

### KEY FEATURES



**PID resistant**



**Excellent module efficiency**  
System Voltage 1000V/1500V



**Positive power tolerance to +5W**



**100% electroluminescence**



**Design Load/Safety Factors:**  
3600Pa/1.5 (downward) 1600Pa/1.5 (upward)



**IP67 junction box for long term endurance**



**10 years product warranty**

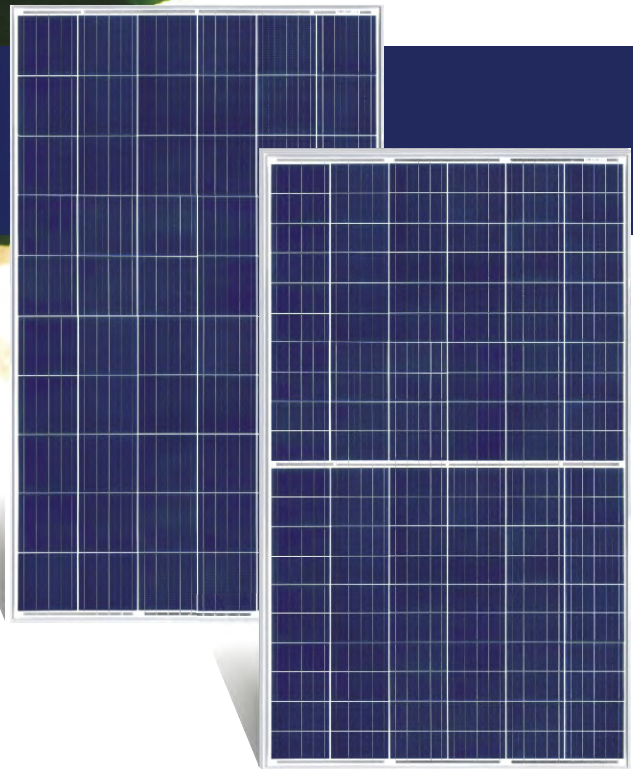
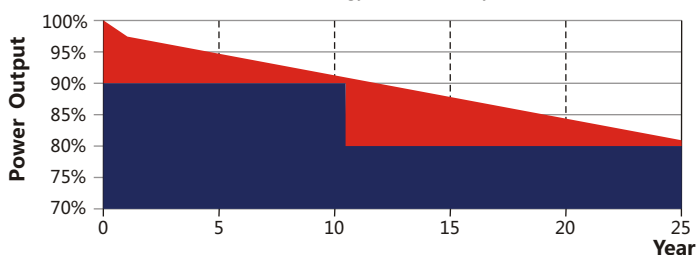


**25 years linear power warranty**

### LINEAR PERFORMANCE WARRANTY

10 year Product Warranty | 25 year Power Output Warranty

■ Risun Green Energy ■ Industry Standard



**Jiangxi Risun Green Energy Co.,Ltd.** is a high-tech PV enterprise dedicated to research & development, production, sales & after sales service, mainly engaged in crystalline silicon solar cells, solar panels, photovoltaic systems, and PV applications. Risun is committed to offer high quality solar components, systems and services to customers around the world.

### MANAGEMENT SYSTEMS CERTIFICATES



Management System  
ISO9001:2015  
www.tuv.com  
ID 9105016347



Management System  
ISO9001:2015  
ISO14001:2015  
OHSAS18001:2007

### PRODUCT CERTIFICATES



### JIANGXI RISUN GREEN ENERGY CO.,LTD.

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P.C.: 338019 Web: [www.risunsolar.com](http://www.risunsolar.com)

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E-mail: [gjsw@risunsolar.com](mailto:gjsw@risunsolar.com) [sales@risunsolar.com](mailto:sales@risunsolar.com)

#### India office: Risun Green Private Limited

Add: 4/14, Twinkle star Chs Ltd, Ghatla Road, Chembur, Mumbai City, Maharashtra, 400071

#### Thailand office: Risun (Thailand) Co.,LTDR

Add: amkhamhaeng Road - Soi Ramkhamhaeng, 24/3 Khwaeng Hua Mak, Khet Bang Kapi, Krung Thep Maha Nakhon 10240, Bangkok, Thailand

#### Germany office: RISUN GmbH

Add: Maelzereistr. 3,90409 Nuernberg, Germany

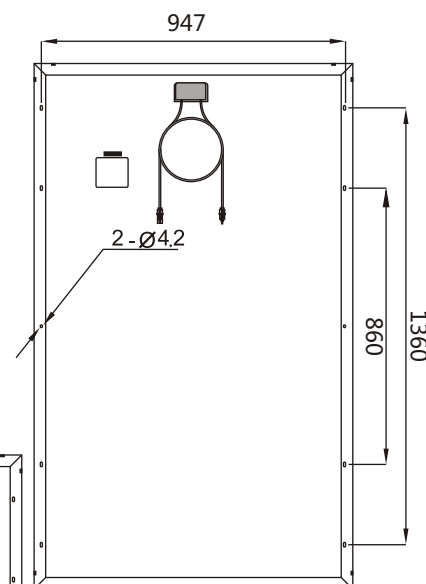
French Office: +33 673 377 108 [contact@risunsolar.fr](mailto:contact@risunsolar.fr)

ELECTRICAL CHARACTERISTICS	RSM60-156P					RSM60H-156P					RSM60-156P-PERC				
Maximum Power P <sub>mp</sub> , [Watt]	260	265	270	275	280	270	275	280	285	290	270	275	280	285	290
Power Tolerance, [W]	0 / +5					0 / +5					0 / +5				
Voltage at Maximum Power Point V <sub>mp</sub> , [V]	30.56	30.81	31.06	31.31	31.56	31.60	31.85	32.05	32.25	32.45	31.06	31.31	31.56	31.81	32.06
Current at Maximum Power Point I <sub>mp</sub> , [A]	8.51	8.60	8.69	8.78	8.87	8.54	8.63	8.74	8.84	8.94	8.69	8.78	8.87	8.96	9.05
Open Circuit Voltage V <sub>oc</sub> , [V]	37.66	37.91	38.15	38.39	38.63	37.95	38.15	38.35	38.55	38.75	38.15	38.39	38.63	38.87	39.11
Short Circuit Current I <sub>sc</sub> , [A]	9.06	9.13	9.20	9.26	9.32	9.05	9.15	9.23	9.35	9.46	9.20	9.26	9.32	9.38	9.44
Module Efficiency, [%]	16.0	16.3	16.6	16.9	17.2	16.3	16.6	16.9	17.2	17.5	16.6	16.9	17.2	17.5	17.8

Measurements under Standard Test Conditions (STC) Irradiance 1000W/m<sup>2</sup>, AM1.5G Spectrum and Cell Temperature 25°C

## MECHANICAL CHARACTERISTICS

Cell Type	Poly-crystalline, 156.75 / 157mm(78.375 / 78.5mm ×2 Half Cell)
Cell Configuration	60 cells (6×10) / 120 cells (6×10×2)
Module Dimension	1640 / 1670mm × 992mm × 35mm
Module Weight	18.2 Kg
Glass	3.2mm , low Iron tempered Solar Glass
Frame	Anodized Al alloy Type 6063 T5; Silver grey
J-Box	Potted, IP67, 1000V/1500V DC, (3 bypass diode)IEC & UL certified
Cable	4.0mm <sup>2</sup> / 12 AWG, 900mm / 300mm, IP67
Connectors	QC4.10



## THERMAL CHARACTERISTICS

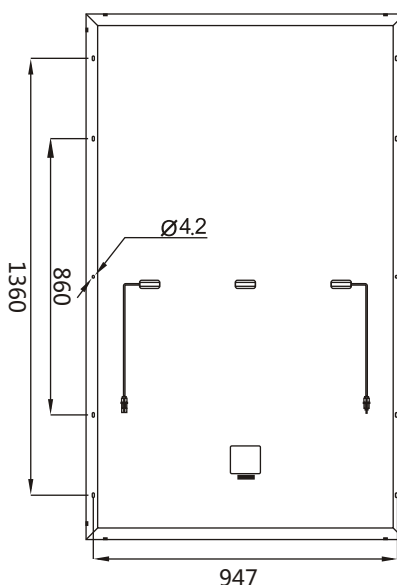
Nominal Operating Temperature NOCT	45 ± 2°C
Temperature Coefficient of I <sub>sc</sub> , α	+0.049 %/°C
Temperature Coefficient of V <sub>oc</sub> , β	-0.309 %/°C
Temperature Coefficient of P <sub>max</sub> , γ	-0.416 %/°C

## MAXIMUM OPERATING INSTRUCTIONS

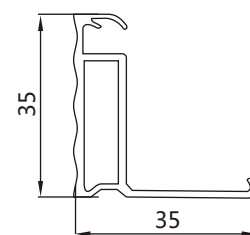
Operating Temperature	-40°C to +85°C
Maximum System Voltage	1000V / 1500V
Maximum Series Fuse Rating	15A

## PACKING INSTRUCTIONS

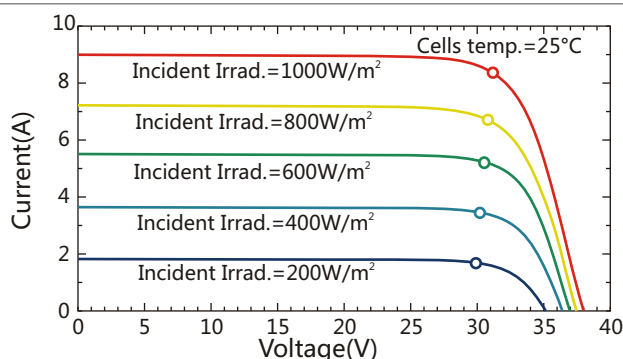
Number Of Modules Per Box / Pallet	30
Number of Pallets / 40' Container	28 / 26



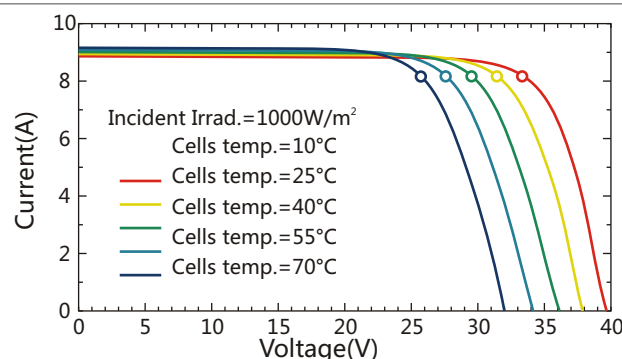
Module Dimension  
(Unit: mm)



Frame Dimension  
(Unit: mm)



Best performance at Low Irradiance, +97% relative Module Efficiency from an Irradiance of 1000W/m<sup>2</sup> to 200W/m<sup>2</sup>





# RSM72(H)-156P

## 315 – 345W

Green Risun Grasp future

### KEY FEATURES



**PID resistant**



**Excellent module efficiency**  
System Voltage 1000V/1500V



**Positive power tolerance to +5W**



**100% electroluminescence**



**Design Load/Safety Factors:**  
3600Pa/1.5 (downward) 1600Pa/1.5 (upward)



**IP67 junction box for long term endurance**



**10 years product warranty**

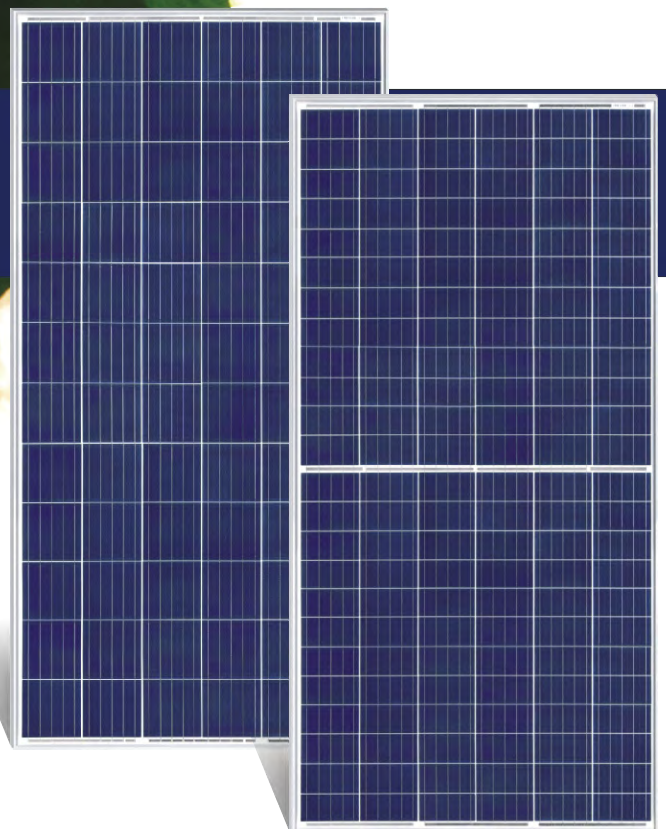
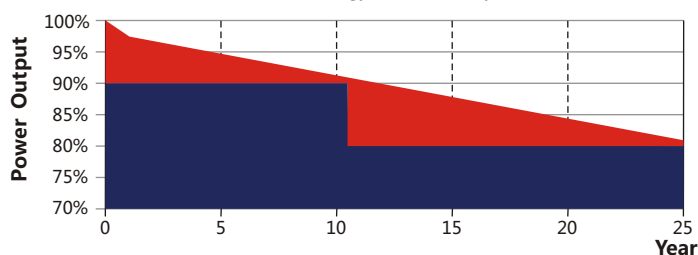


**25 years linear power warranty**

### LINEAR PERFORMANCE WARRANTY

10 year Product Warranty | 25 year Power Output Warranty

■ Risun Green Energy ■ Industry Standard



**Jiangxi Risun Green Energy Co.,Ltd**, is a high-tech PV enterprise dedicated to research & development, production, sales & after sales service, mainly engaged in crystalline silicon solar cells, solar panels, photovoltaic systems, and PV applications. Risun is committed to offer high quality solar components, systems and services to customers around the world.

### MANAGEMENT SYSTEMS CERTIFICATES



Management System  
ISO9001:2015  
www.tuv.com  
ID 9105016347



Management System  
ISO9001:2015  
ISO14001:2015  
OHSAS18001:2007

### PRODUCT CERTIFICATES



www.tuv.com  
ID 141005045



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Add: 4/14, Twinkle star Chs Ltd, Ghatla Road, Chembur, Mumbai City, Maharashtra, 400071

#### Thailand office: Risun (Thailand) Co.,LTDR

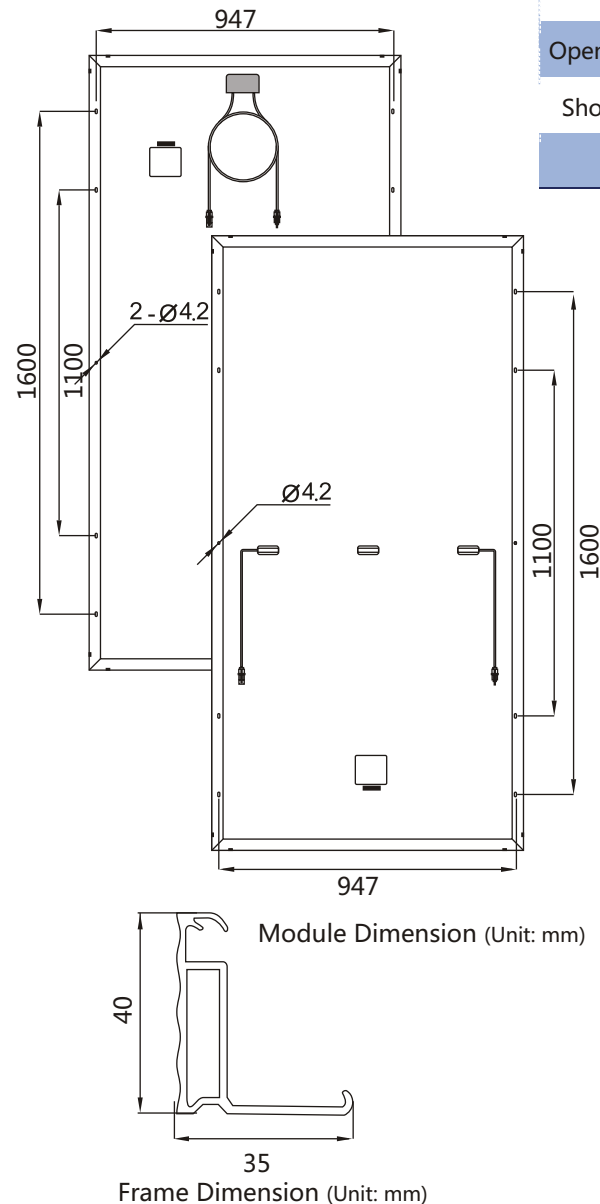
Add: amkhamhaeng Road - Soi Ramkhamhaeng, 24/3 Khwaeng Hua Mak, Khet Bang Kapi, Krung Thep Maha Nakhon 10240, Bangkok, Thailand

#### Germany office: RISUN GmbH

Add: Maelzereistr. 3,90409 Nuernberg, Germany

French Office: +33 673 377 108 [contact@risunsolar.fr](mailto:contact@risunsolar.fr)

# RSM72(H) -156P 315 – 345W



## ELECTRICAL CHARACTERISTICS

Maximum Power P <sub>mp</sub> , [Watt]	315	320	325	330	335	340	345
Power Tolerance, [W]	0 / +5						
Voltage at Maximum Power Point V <sub>mp</sub> , [V]	36.97	37.25	37.53	38.21	37.80	38.41	38.11
Current at Maximum Power Point I <sub>mp</sub> , [A]	8.52	8.59	8.66	8.51	8.73	8.59	8.79
Open Circuit Voltage V <sub>oc</sub> , [V]	45.60	45.80	46.00	45.58	46.20	45.78	46.40
Short Circuit Current I <sub>sc</sub> , [A]	9.04	9.09	9.15	8.93	9.23	9.03	9.27
Module Efficiency, [%]	16.2	16.5	16.7	16.4	17.0	16.6	17.3

Measurements under Standard Test Conditions (STC)  
Irradiance 1000W/m<sup>2</sup>, AM1.5G Spectrum and Cell Temperature 25°C

## MECHANICAL CHARACTERISTICS

Cell Type	Poly-crystalline, 156.75 / 157mm(78.375 / 78.5mm × 2 Half Cell)
Cell Configuration	72 cells (6×12) / 144 cells (6×12×2)
Module Dimension	1956 / 2000mm × 992mm × 40mm
Module Weight	21.5 kg
Glass	3.2mm , low Iron tempered Solar Glass
Frame	Anodized Al alloy Type 6063 T5; Silver grey
J-Box	Potted, IP67, 1000V / 1500V DC, (3 bypass diode) IEC & UL certified
Cable	4.0mm <sup>2</sup> / 12 AWG, 900mm / 300mm, IP67
Connectors	QC4.10

## THERMAL CHARACTERISTICS

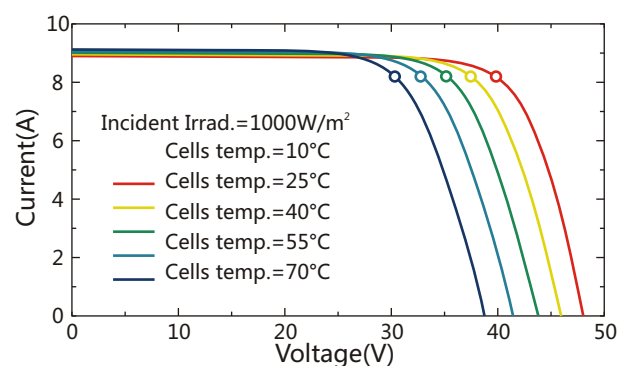
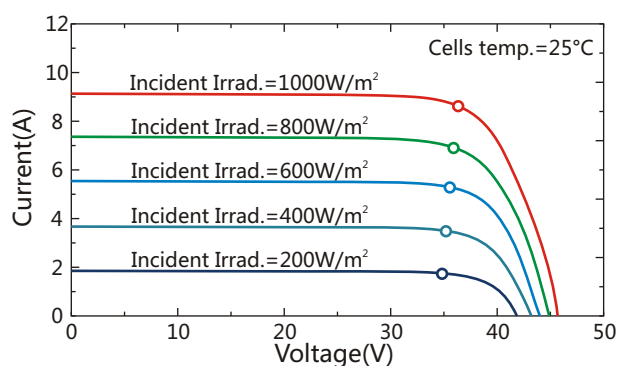
Nominal Operating Temperature NOCT	45 ± 2°C
Temperature Coefficient of I <sub>sc</sub> , α	+0.049 %/°C
Temperature Coefficient of V <sub>oc</sub> , β	-0.309 %/°C
Temperature Coefficient of P <sub>max</sub> , γ	-0.416 %/°C

## MAXIMUM OPERATING INSTRUCTIONS

Operating Temperature	-40°C to +85°C
Maximum System Voltage	1000V / 1500V
Maximum Series Fuse Rating	15A

## PACKING INSTRUCTIONS

Number Of Modules Per Box / Pallet	27
Number of Pallets / 40' Container	24 / 22

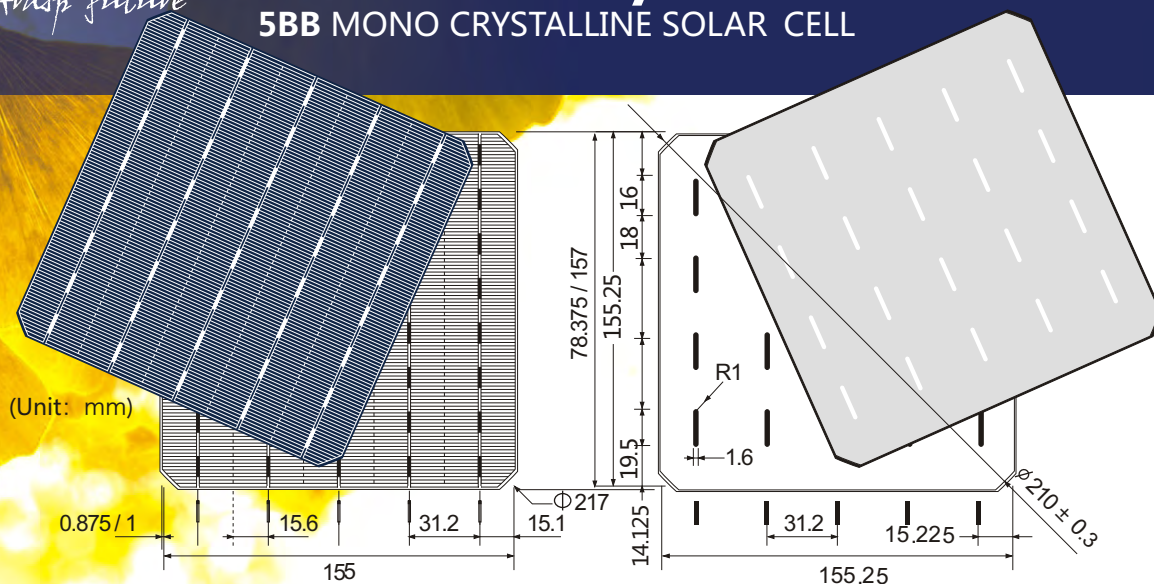




Green Risun Grasp future

# RSC156.75 / 157M

## 5BB MONO CRYSTALLINE SOLAR CELL



### FEATURES

- Ozonized PID resistant process
- Tighter color variation control<sup>①</sup>
- <1.0mm graphite boat button size<sup>②</sup>
- >1.5N peel strength for Front Ag busbar<sup>③</sup>
- >2.0N peel strength for Back Ag busbar<sup>③</sup>
- Cell bow <2.0mm

### MECHANICAL DATA & DESIGN

Format	157mm×157mm / 156.75mm×156.75mm
Thickness	180 ± 18µm
Front	0.8mm wide discontinuous BB SiN Blue ARC
Back	1.6mm exposed BB width Al BSF

### TEMPERATURE COEFFICIENTS

Voc (β)	-0.36% /°C
Isc (α)	+0.07% /°C
Pmp (γ)	-0.38% /°C

① Ref: Risun Optical Inspection Standard; Please contact sales@risunsolar.com for the document.

② Graphite button mark not protruding the extreme fingers or cover fingers. Peel strength test referenced to 180° peel angle using Auto Tab Pull Tester.

**Remark:** Product specifications are subject to change without notice. Risun reserves the right for the final interpretation of all figures reported in this specification document.

### CELL SPECIFICATION

Eff, %	Pmpp, W	Vmpp, V	Impp, A	Voc, V	Isc, A	FF, %
22.10	5.40	0.578	9.34	0.679	9.87	80.70
22.00	5.38	0.577	9.32	0.678	9.85	80.66
21.90	5.35	0.576	9.29	0.676	9.84	80.61
21.80	5.33	0.575	9.26	0.675	9.81	80.55
21.70	5.30	0.573	9.25	0.674	9.79	80.50
21.60	5.28	0.572	9.23	0.672	9.78	80.46
21.50	5.25	0.570	9.216	0.669	9.764	80.42
21.40	5.23	0.569	9.189	0.668	9.739	80.36
21.30	5.20	0.568	9.162	0.667	9.715	80.31
21.20	5.18	0.567	9.135	0.666	9.690	80.27
21.10	5.16	0.566	9.108	0.665	9.663	80.22
21.00	5.13	0.565	9.081	0.664	9.640	80.16
20.90	5.11	0.564	9.054	0.663	9.612	80.12
20.80	5.08	0.563	9.026	0.662	9.591	80.04
20.70	5.06	0.562	8.999	0.661	9.568	79.96
20.60	5.03	0.561	8.971	0.660	9.544	79.90
20.70	5.06	0.552	9.12	0.651	9.62	80.73
20.60	5.03	0.551	9.09	0.650	9.59	80.71
20.50	5.01	0.550	9.07	0.649	9.56	80.68
20.40	4.98	0.549	9.04	0.648	9.54	80.66
20.30	4.96	0.548	9.01	0.647	9.51	80.61
20.20	4.94	0.547	8.98	0.646	9.48	80.59
20.10	4.91	0.546	8.95	0.645	9.45	80.57
20.00	4.89	0.545	8.93	0.644	9.43	80.46
19.90	4.86	0.544	8.89	0.643	9.41	80.35
19.80	4.84	0.543	8.87	0.642	9.39	80.25

Measurements at Standard Test Conditions (STC), 1000W/m<sup>2</sup>, 25°C, AM1.5G Spectrum



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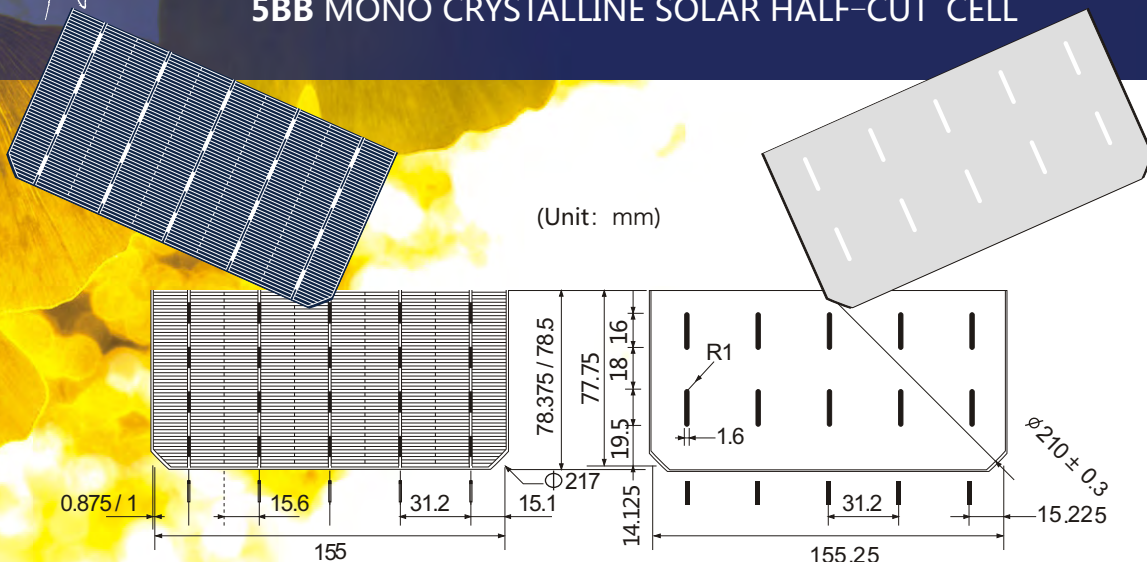
French Office: +33 673 377-108 -contact@risunsolar.fr

Rev : 01

Green Risun Grasp future

# RSHC156.75 / 157M

## 5BB MONO CRYSTALLINE SOLAR HALF-CUT CELL



### FEATURES

- Ozonized PID resistant process
- Tighter color variation control<sup>①</sup>
- <1.0mm graphite boat button size<sup>②</sup>
- >1.5N peel strength for Front Ag busbar<sup>③</sup>
- >2.0N peel strength for Back Ag busbar<sup>③</sup>
- Cell bow <2.0mm

### MECHANICAL DATA & DESIGN

Format	78.5mm×157mm / 78.375mm×156.75mm
Thickness	180 ± 18μm
Front	0.8mm wide discontinuous BB SiN Blue ARC
Back	1.6mm exposed BB width Al BSF

### TEMPERATURE COEFFICIENTS

Voc (β)	-0.36% /°C
Isc (α)	+0.07% /°C
Pmp (γ)	-0.38% /°C

① Ref: Risun Optical Inspection Standard; Please contact sales@risunsolar.com for the document.

② Graphite button mark not protruding the extreme fingers or cover fingers. Peel strength test referenced to 180° peel angle using Auto Tab Pull Tester.

**Remark:** Product specifications are subject to change without notice. Risun reserves the right for the final interpretation of all figures reported in this specification document.

### CELL SPECIFICATION

Eff, %	Pmpp, W	Vmpp, V	Impp, A	Voc, V	Isc, A	FF, %
22.10	2.70	0.578	4.670	0.679	4.935	80.70
22.00	2.69	0.577	4.660	0.678	4.925	80.66
21.90	2.67	0.576	4.645	0.676	4.920	80.61
21.80	2.66	0.575	4.630	0.675	4.895	80.55
21.70	2.65	0.573	4.625	0.674	4.890	80.50
21.60	2.64	0.572	4.615	0.672	4.882	80.46
21.50	2.63	0.570	4.608	0.669	4.882	80.42
21.40	2.62	0.569	4.595	0.668	4.870	80.36
21.30	2.60	0.568	4.581	0.667	4.858	80.31
21.20	2.59	0.567	4.568	0.666	4.845	80.27
21.10	2.58	0.566	4.554	0.665	4.832	80.22
21.00	2.57	0.565	4.541	0.664	4.820	80.16
20.90	2.56	0.564	4.527	0.663	4.806	80.12
20.80	2.54	0.563	4.513	0.662	4.796	80.04
20.70	2.53	0.562	4.500	0.661	4.784	79.96
20.60	2.52	0.561	4.486	0.660	4.772	79.90
20.70	2.53	0.552	4.56	0.651	4.81	80.73
20.60	2.52	0.551	4.55	0.650	4.80	80.71
20.50	2.51	0.550	4.54	0.649	4.78	80.68
20.40	2.49	0.549	4.52	0.648	4.77	80.66
20.30	2.48	0.548	4.51	0.647	4.76	80.61
20.20	2.47	0.547	4.49	0.646	4.74	80.59
20.10	2.46	0.546	4.48	0.645	4.73	80.57
20.00	2.45	0.545	4.47	0.644	4.72	80.46
19.90	2.43	0.544	4.45	0.643	4.71	80.35
19.80	2.42	0.543	4.44	0.642	4.70	80.25

Measurements at Standard Test Conditions (STC), 1000W/m<sup>2</sup>, 25°C, AM1.5G Spectrum



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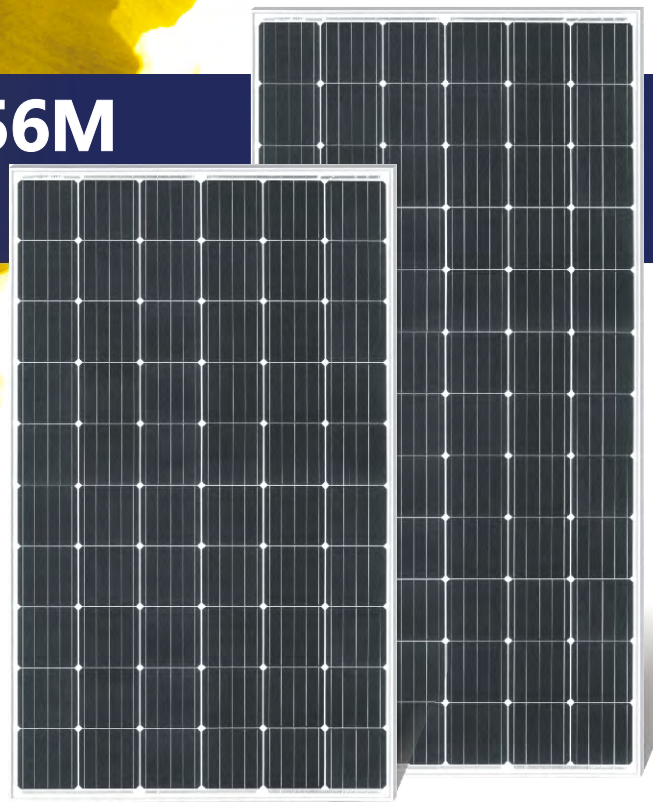
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Rev : 01



# RSM60-156M | RSM72-156M

## 275 – 300W | 320 – 345W



### KEY FEATURES



**PID resistant**



**Excellent module efficiency**



**Positive power tolerance to +5W**



**100% electroluminescence**



**Design Load/Safety Factors:**  
3600Pa/1.5 (downward) 1600Pa/1.5 (upward)



**IP67 junction box for long term endurance**



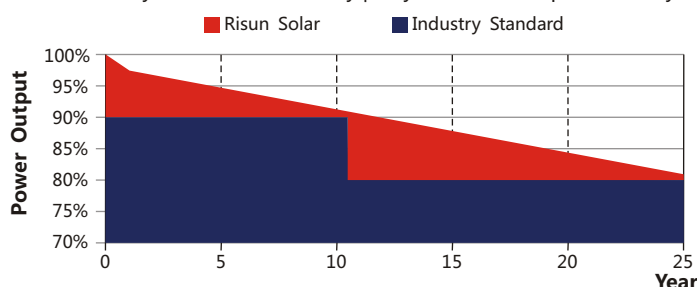
**10 years product warranty**



**25 years linear power warranty**

### LINEAR PERFORMANCE WARRANTY

10 year Product Warranty | 25 year Power Output Warranty



**Jiangxi Risun Green Energy Co.,Ltd**, is a high-tech PV enterprise dedicated to research & development, production, sales & after sales service, mainly engaged in crystalline silicon solar cells, solar panels, photovoltaic systems, and PV applications. Risun is committed to offer high quality solar components, systems and services to customers around the world.

### MANAGEMENT SYSTEMS CERTIFICATES



### PRODUCT CERTIFICATES



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# RSM60-156M | RSM72-156M

## 275 – 300W | 320 – 345W

### ELECTRICAL CHARACTERISTICS

Maximum Power P <sub>mp</sub> , [Watt]	275	280	285	290	295	300	320	325	330	335	340	345
Power Tolerance, [W]	0 / +5											
Voltage at Maximum Power Point V <sub>mp</sub> , [V]	30.88	31.09	31.30	31.51	31.70	31.90	36.90	37.10	37.30	37.50	37.71	37.91
Current at Maximum Power Point I <sub>mp</sub> , [A]	8.91	9.01	9.11	9.20	9.31	9.41	8.69	8.77	8.85	8.93	9.02	9.10
Open Circuit Voltage V <sub>oc</sub> , [V]	38.42	38.57	38.73	38.90	39.10	39.30	45.60	45.80	45.99	46.21	46.43	46.65
Short Circuit Current I <sub>sc</sub> , [A]	9.38	9.47	9.56	9.65	9.70	9.75	9.21	9.28	9.35	9.42	9.50	9.57
Module Efficiency, [%]	16.9	17.3	17.6	17.9	18.2	18.5	16.5	16.7	17.0	17.3	17.5	17.8

Measurements under Standard Test Conditions (STC)  
Irradiance 1000W/m<sup>2</sup>, AM1.5G Spectrum and Cell Temperature 25°C

### MECHANICAL CHARACTERISTICS

Cell Type	Mono-crystalline, 156.75mm × 156.75mm / 157mm × 157mm
Cell Configuration	60 cells (6 × 10) / 72 cells (6 × 12)
Module Dimension	1640mm × 992mm × 35mm / 1956mm × 992mm × 40mm
Module Weight	18.2 Kg / 21.5 Kg
Glass	3.2mm, low Iron tempered Solar Glass
Frame	Anodized Al alloy Type 6063 T5; Silver grey
J-Box	Potted, IP67, 1000V / 1500V DC, IEC & UL certified
Cable	4.0mm <sup>2</sup> / 12 AWG, 900 mm, IP67
Connectors	QC4.10

### THERMAL CHARACTERISTICS

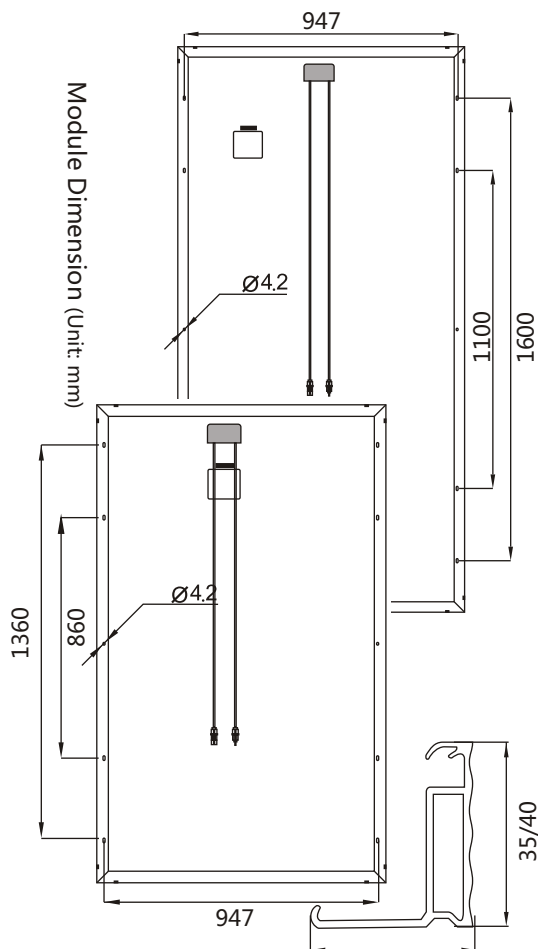
Nominal Operating Temperature NOCT	45 ± 2°C
Temperature Coefficient of I <sub>sc</sub> , α	+0.06 %/°C
Temperature Coefficient of V <sub>oc</sub> , β	-0.34 %/°C
Temperature Coefficient of P <sub>max</sub> , γ	-0.41 %/°C

### MAXIMUM OPERATING INSTRUCTIONS

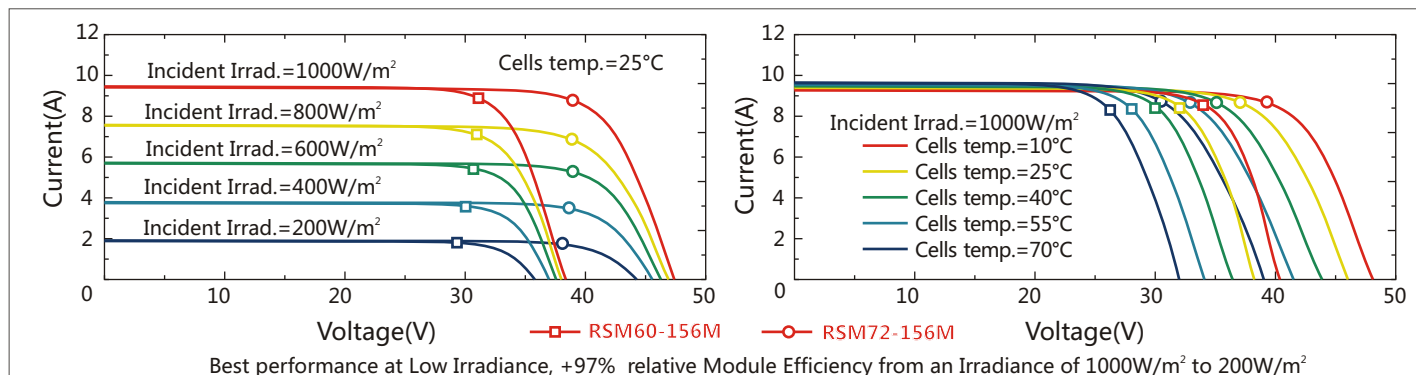
Operating Temperature	-40°C to +85°C
Maximum System Voltage	1000V / 1500V
Maximum Series Fuse Rating	15A

### PACKING INSTRUCTIONS

Number Of Modules Per Box / Pallet	30 / 27
Number of Pallets / 40' Container	28 / 22



Frame Dimension (Unit: mm) 35





# PV SYSTEM PHOTOVOLTAIC PLANT



## PHOTOVOLTAIC PLANT MATERIAL LIST

Photovoltaic plant capacity				
	1kWp	3kWp	5kWp	10kWp
Product	product style×quantity(Unit)			
Panel	270W×4pcs(1080Wp)	270W×12pcs(3240Wp)	270W×20pcs(5400Wp)	270W×40pcs(10800Wp)
Structure	Al alloy/steel			
Inverter	1KWp×1pcs	3KWp×1pcs	5KWp×1pcs	10KWp×1pcs
Cable	(PV1-F 1*4)×①m	① Quantity based on the distance between the Inverter and modules		
	(ZRYJV-1KV-3*2.5)×②(m)	(ZRYJV-1KV-3*4)×②(m)	(ZRYJV-1KV-4*6)×③(m)	(ZRYJV-1KV-3*10+1*6)×④(m)
	② Quantity based on the distance between the Inverter and on-grid point			
Photovoltaic Controller	220V×1pcs			380V×1pcs
Spool	Dn25×③m	③ Quantity based on the distance between the Inverter and photovoltaic controller		
Ground Angle Steel	50*50/2.5m×1pcs			
Ground Flat Steel	4*40×④m	④ /Quantity based on the distance between the structure and ground		
Others	1sum			

Remarks : Panels can be customized and meet 1000V/1500V system voltage.

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## 10KW PV ENERGY STORAGE INTEGRATION SYSTEM

### RSSS9.8-14.4KWH Features

**Lithium Battery** Longer Cycling Life and Higher Safety  
**High Efficiency** High Pressure Battery ,High System Efficiency, Electro-discharge Depth Above 80%  
**Intelligence** Build-In and Off-Grid Auto Switching Device To Assure Power Supplying In The Event Of Power Failure

### RSSS9.8-14.4KWH System Parameter

PV Side Input		Cell Side Input		Battery Pack	
Maximum Input Power	9.8kW	Operating Voltage Range	288V	Nominal Capacity	14.4kWh
MPPT Voltage	350-800V	Max. Charging Power	8.0kW	Module/Unit	48V/50Ah Lithium Battery Module * 6 Groups
MPPT Amount	1	Max. Charging Current	27.7A	Cycle Life	80% Discharge Depth Cycle Life Above 6000 Times
		Charging/Discharging Efficiency	97%/96.5%	Size [W*H*D]	563*400*1610mm
				Weight	210kg

### AC Output- Grid Connected Condition

Max. Output Power	9.5-5kW 【Grid Connected – Off Grid】
Output Voltage	220-400V
Rated Voltage&frequency	400±2%,50±2% V/Hz
Power Factor	[-0.95,+0.95]
Inverter Size[W*H*D]	540*670*275mm
Inverter Weight	55kg



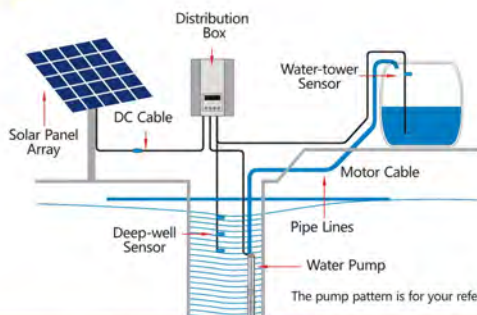


# PV SYSTEM POWER FREQUENCY DIRECT DRIVE SOLAR PHOTOVOLTAIC PUMP



## Remarks:

1. With high pressure detection protection, under-voltage protection, blocking protection, over-current protection, water protection function, to realize unattended, intelligent control.
2. Stainless steel pump body.
3. Water pump with 2 m cable, can make custom cable length, according to customer request according to different wire diameter and accounting.
4. According to the sunshine status of using land, matching component of power= pump power \* 1.3 - 2.0.
5. This product provide one year quality warranty.
6. Panels can be customized and meet 1000V/1500V system voltage.



Model	Power (W)	MPPT Voltage (V)	Open-circuit Voltage (V)	Rated Head (m)	Max Head (m)	Rated(Max) Flow (T/H)	Water Inlet (mm)	Water Outlet (Inch)	Level of protection	Measurement diameter (mm)	Height (mm)	Deep-well Sensor	Accessories Water-tower Sensor	Distribution Box	Module Power (W)
3SH1.5/7-0.18	180	36	44	24	30	1.5	76	1	IP68	76	740	1	1	1	270
3SH1.5/10-0.25	250	36	44	34	45	1.5	76	1	IP68	76	800	1	1	1	370
3SH1.5/14-0.37	370	36	44	48	59	1.5	76	1	IP68	76	950	1	1	1	550
3SH2.5/5-0.18	180	36	44	15	25	2.5	76	1	IP68	76	720	1	1	1	270
3SH2.5/7-0.25	250	36	44	21	32	2.5	76	1	IP68	76	770	1	1	1	370
3SH2.5/10-0.37	370	36	44	31	42	2.5	76	1	IP68	76	860	1	1	1	550
4SH1.5/7-0.25	250	36	44	30	49	1.5	100	1.25	IP68	96	890	1	1	1	370
4SJ1.5/10-0.37	370	110	140	49	70	1.5	100	1.25/1.5	IP68	96	774	1	1	1	550
4SJ1.5/14-0.55	550	110	140	68	98	1.5	100	1.25/1.5	IP68	96	890	1	1	1	800
4SJ2/8-0.37	370	110	140	44	56	2	100	1.25/1.5	IP68	96	719	1	1	1	550
4SJ2/11-0.55	550	110	140	61	77	2	100	1.25/1.5	IP68	96	809	1	1	1	800
4SJ4/6-0.37	370	110	140	30	43	4	100	1.25/1.5	IP68	96	694	1	1	1	550
4SJ4/8-0.55	550	110	140	39	58	4	100	1.25/1.5	IP68	96	766	1	1	1	800
4SJ6/6-0.37	370	110	140	18	33	6	100	1.25/1.5	IP68	96	694	1	1	1	550
4SJ6/7-0.55	550	110	140	26	46	6	100	1.25/1.5	IP68	96	770	1	1	1	800
4SJ8/5-0.55	550	110	140	19	32	8	100	1.25/1.5	IP68	96	746	1	1	1	800
4SJ10/4-0.55	550	110	140	14	19	10	100	1.25/1.5	IP68	96	708	1	1	1	800
4SC24-30	300	18-36	44	20	40	2(4)	100	1.2	IP68	/	/	/	/	/	450
4SC48-60	600	28-72	88	40	70	2(4)	100	1.2	IP68	/	/	/	/	/	900

Household Solar Photovoltaic Pump

# Solar PV Tank (SPVT) multi-energy complementary application system

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Application Engineering Co., Ltd.

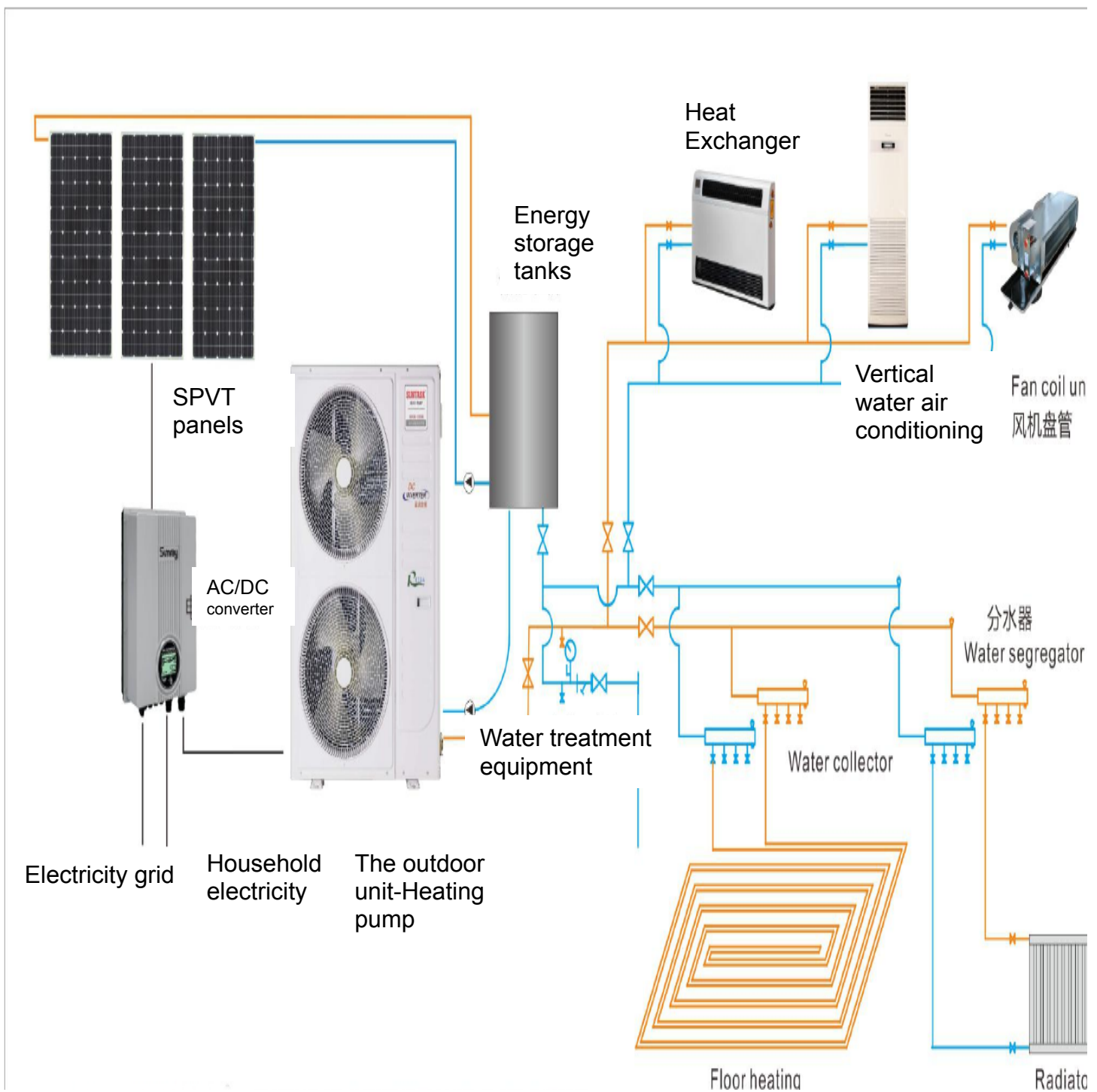
# **SPVT complementary system**

## **SPVT linkage power station**

### **Heating and Power supply**

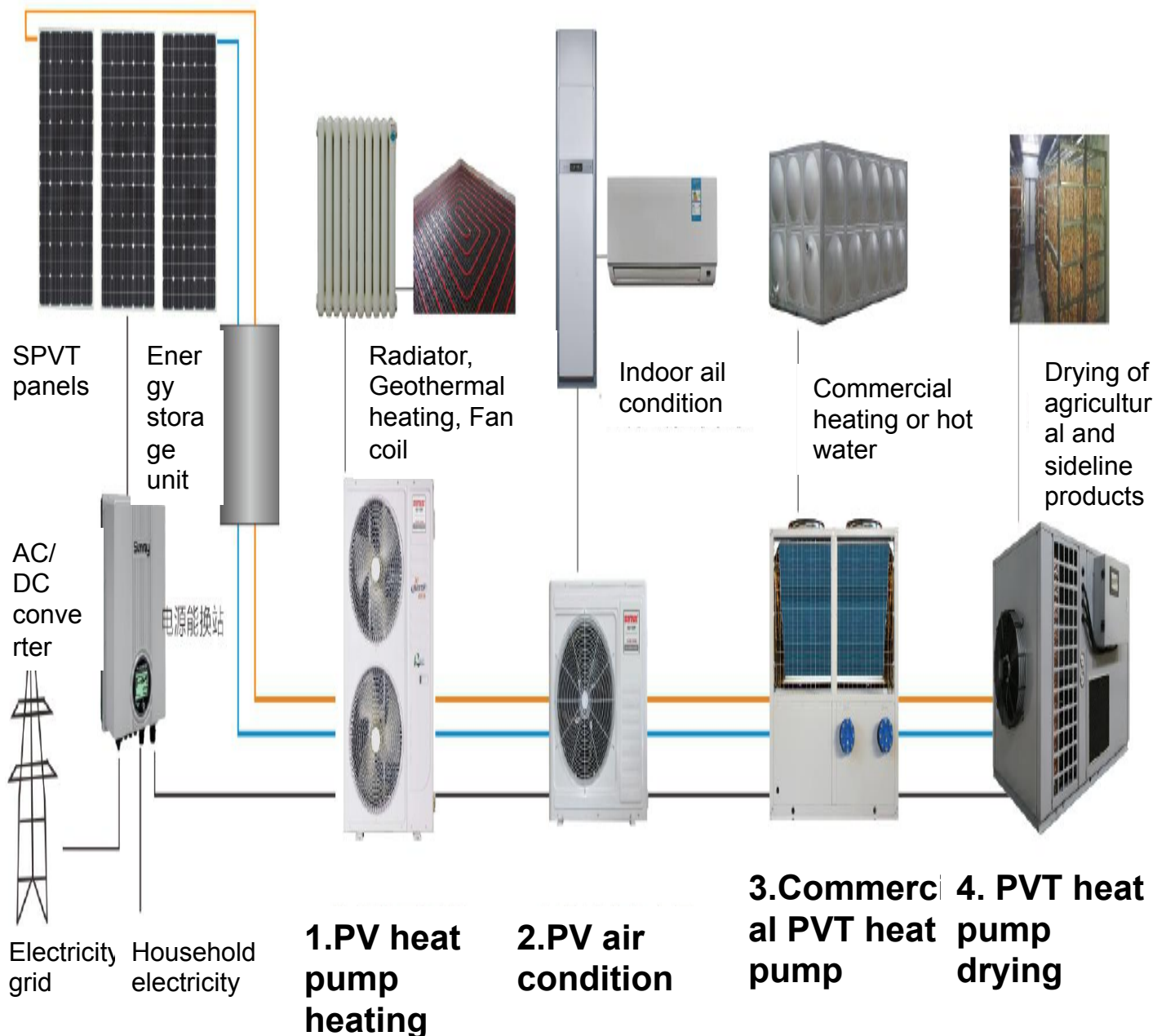
- Power generation + Hot water + Heating
- Power generation increased by 10%
- Photovoltaic power can be got every seasons
- The added heat can be recovered
- Heat pump power supply can be automatically switched between photovoltaic and grid
- Electricity generation on Spring, summer and autumn can be made up for winter heating electricity
- Lower panels temperature and increase power generation





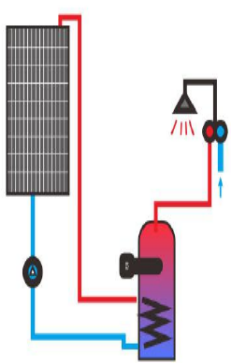
## SPVT multi-energy complementary application system

# Multiple applications

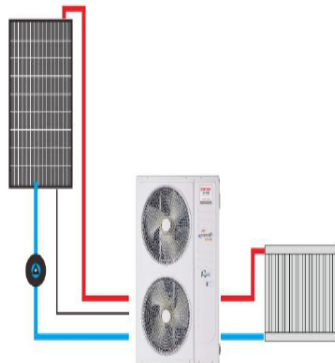


SPVT multi-energy complementary application system

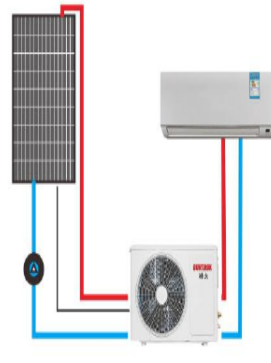
# Application of PV added heat recovery



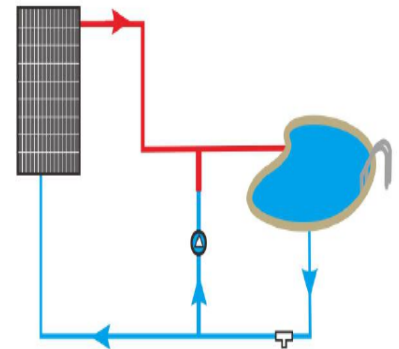
**Direct heating of household water**



**Linkage with PV heat pump to supply heat**



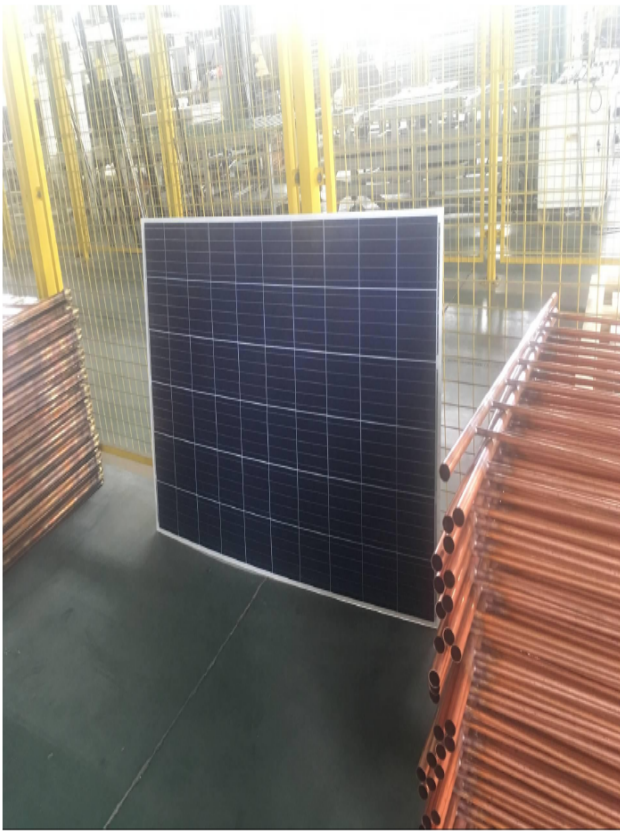
**PV air condition**



**Commercial heating water**



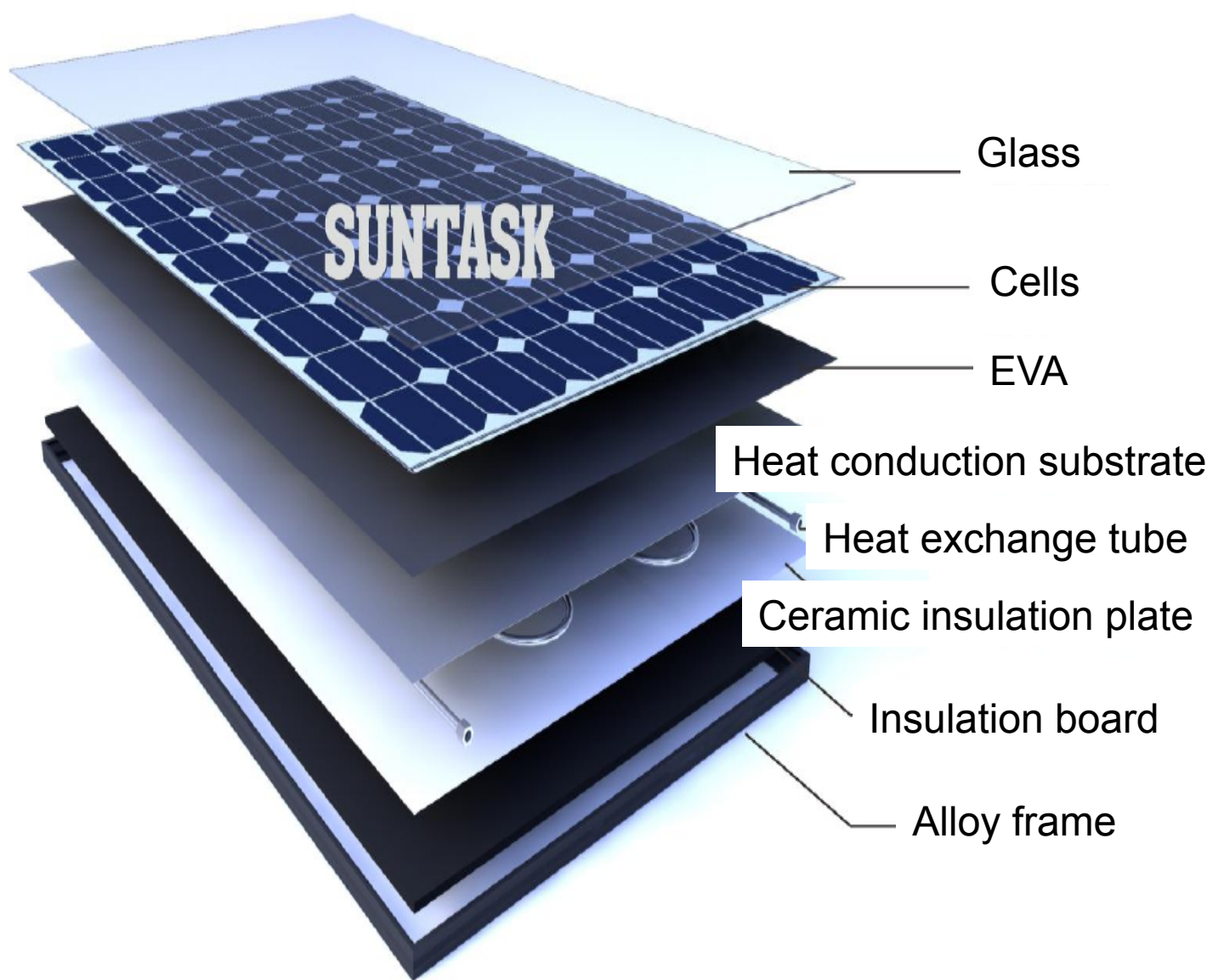
# Product advantages structure



**Normal PV Panels**



**SPVT Panels**  
**Add waste heat diversion**  
**device**





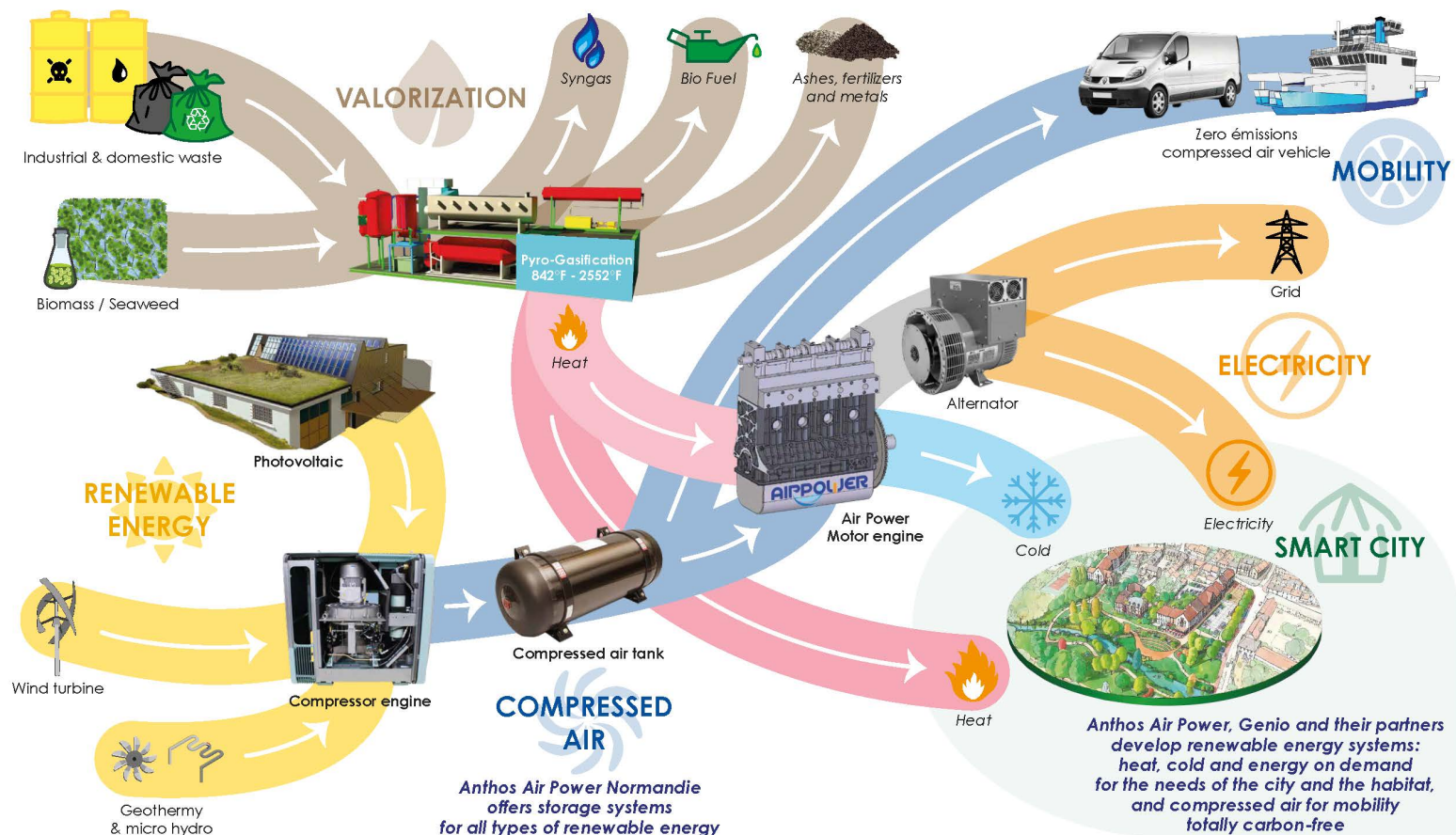


## Comparison of economic benefits

Hot water equipment project	SPVT system	Air-energy heat pump	Electric water heater	Gas water heater
Energy type	PV and Air heat	Air heat	Electricity	Gas
Energy calorific value	860 cal/kwh	860 cal/kwh	860 cal/kwh	10800kcal/kg
Energy Ratio	450%(environmental temperature-15°C)	180%(environmental temperature-15°C)	100%	96%
Actual heat	3870Kcal/kwh	1470Kcal/kwh	817Kcal/kwh	8100Kcal/kg
Heating energy consumption	10.17kwh	23.7kwh	42.8kwh	4.32kg
Heating cost(USD)	1.1(Removing PV benefits)	2.6	4.63	4.165
Environmental impact	non-pollution	non-pollution	non-pollution	combustion emissions
Performance index	PV power can be got all the year, incidental heating energy can be supply to heat pump	Low energy efficiency in cold environments	High energy consumption	Safety risks and environmental pollution



## LOCAL RESSOURCES > LOCAL ENERGY > ECO MOBILITY



Anthos Air Power Normandie  
50, rue Effore Bugatti - Saint-Étienne-du-Rouvray  
02.35.65.78.65



[www.anthosairpower.com](http://www.anthosairpower.com)

## APPLICATION AERAS

- **Storage of renewable** energies and production of energy on demand,
- **Energy security** (hospitals, cinemas, electricity and cold backup generator),
- **Data center** (generator and cooling unit),
- **Agriculture** (isolated sites, irrigation and cold production),
- **Building and public works industry** (urban sites prohibiting the release of CO<sub>2</sub>).

18kW model - Digital dashboard -  
6 sockets from 220 to 380V - CE standards



## COMPRESSED AIR GENERATOR

Anthos Air Power develops generators operating with **compressed air** with high energy efficiency (patented technology).

*The advantages of technology:*

- **100% clean:** Zero emission of CO<sub>2</sub>, NO<sub>x</sub> and other polluting particles;
- **Cold** production (to be valued at the outlet exhaust) in addition to **electricity**.

*Anthos Air Power specializes in Renewable Energies & the Environment. It's a new technologies's developer.*

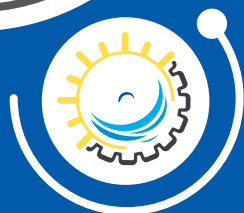
## COMPRESSED AIR: CLEAN STORAGE SOLUTION AND RELIABLE ENERGY

*100% clean and modular complete solution for isolated site:  
photovoltaic / wind panels, inverter, air compressor, compressed air storage  
tanks, generator running on compressed air, refrigerated room (recovery of  
cold): example, 200m<sup>2</sup> of photovoltaic surface produce 100kWh per day and  
cold at -60 °C.*

# ANTHOS Air Power

— NORMANDIE —

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### SPECIFICATIONS

#### Gamme 18kW

**Input, compressed air  
consumption (pressure; 400bar):**

- Basic Mode 30L / kWh
- Turbo Mode 20L / kWh

**Output, generation:**

- Electricity : 18 kWh
- Cold : 200 m<sup>3</sup>/h at -60°C

**Dimensions:**

L 1,8m x l 1,1m x h 1,65m



The two main renewable energies, solar and wind, are intermittent and rarely match with demand.

Energy storage is a key for the future development of clean energy.

The batteries and hydrogen provide a solution for certain applications but remain expensive, limited in terms of recharging cycles and their recycling remain complex.

**Compressed air** presents itself as an advantageous, simple and reachable solution. Its storage is economical, clean, unlimited in cycles and very attractive for sites far from electrical networks. In addition, it has the distinction of producing cold at the same time as electricity!

The future makes it possible to foresee the creation of dozens of products in the field of energy, refrigeration, land and maritime mobility and to generate employment in the territory with the establishment of local production stations.



*Target market with  
the compressed air  
motor engine:  
**MOBILITY.**  
For buses, boats,  
utility vehicles,  
etc.*





2019-2020: Pilote & Test phase

## TARGET MARKET: MOBILITY

Usable for communities and professionals, in benefit of **"logistics of the last kilometers"**.

Also usable for **urban transport**, fleets of commercial vehicles, buses and minibus for **daily journeys** (150km, refilling in 5 min).

With our technology, we offer you a **new way of producing and using energy**.



## COMPRESSED AIR SERVING MOBILITY

Anthos Air Power is developing a utility vehicle powered by compressed air:

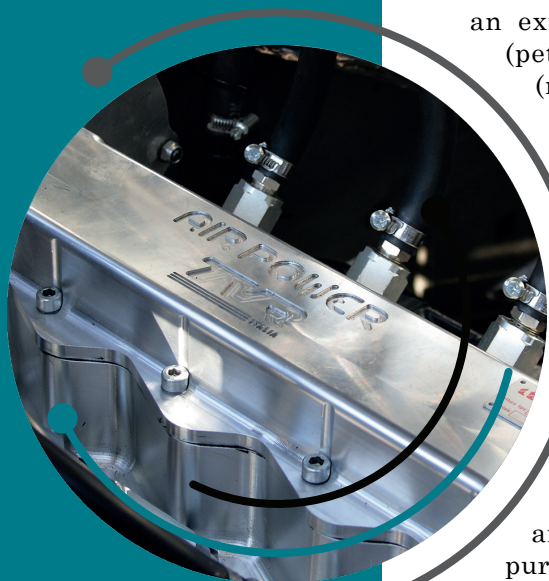
- 100% clean: Zero emission of CO<sub>2</sub>, NO<sub>x</sub> and other polluting particles
- Up to 150km autonomy
- Full filling with compressed air: 5 minutes

**Compressed air: simple, clean and endless energy!**

*Anthos Air Power specializes in Renewable Energies & Environment. It's a new technologies' Developer.*

## COMPRESSED AIR MOTOR ENGINE

Technological innovation and circular economy: ANTHOS AIR POWER has developed a kit which fits on an existing motor heat engine (petrol or diesel). The engine (new or recycled) transforms into an engine running on compressed air while maintaining high performance.



## ZERO EMISSIONS

It's mainly the pollutants emitted from the exhaust of combustion vehicles that are very problematic for public health. The compressed air engine only releases purified cold air into the atmosphere (which can be used in the vehicle's air conditioning system).

## FAST FILLING

In just 5 minutes of charging on a station, you'll have up to 150km of autonomy.

The compressed air utility vehicle is particularly well suited for daily journeys in urban areas and private sites.

## SIMPLE AND REACHABLE SOLUTION

Compressed Air as a source of renewable energy storage, clean energy production and cold has its place in the combination of new energies. It has the distinction of being simple and accessible.

*The future allows us to foresee the creation of dozens of products in the spheres of energy, refrigeration, land and maritime mobility; and generate employment on the territory with the establishment of local production stations.*



**Lifetime**  
(critical equipment)

**Number of refills**

**Rares metals**

**Heavy metals**

**Hydrocarbons**

**Autonomy**

**Filling at 80 %**

**CO2 emissions**



**Diesel**

**25 years**  
(tank)

**illimited**

**Yes**  
(catalytic converters)

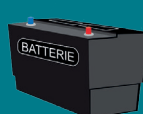
**Not disclosed**

**Not recyclable**  
**Très polluants**

**600 km**

**About 3 min.**  
for full filling

• For 40 000 km/year:  
**8,5 T/year**  
• Manufacturing pieces and equipment:  
**400 kg**



**Battery**

**5 years**  
(battery)

**3000 to 5000**

**Yes**  
(battery 1<sup>re</sup> gen.)

**Problematic recycling**

**None**

**200 to 500 km**

• Slow: **13 hours**  
• Middle: **8 hours**  
• Fast: **4 hours**

• For 40 000 km/year:  
**0 kg**  
• Manufacturing pieces and equipment:  
**1,8 T**



**Hydrogen**

**5 years**  
(fuel cell)

**20 to 40 000 h.**  
(gaz bottle)

**Yes**  
(not recyclables: platinum)

**Problematic recycling**

**None**

**200 to 500 km**

**About 5 min.**  
for full filling

• For 40 000 km/year:  
**0 à 8,5 T/year**  
• Manufacturing pieces and equipment:  
**320 kg**



**Compressed Air**

**25 years**  
(gaz bottle)

**illimited**

**None**  
(gas bottle)

**None**

**None**

**150 km**

• Slow: **15 min.**  
• Middle: **8 min.**  
• Fast: **5 min.**

• For 40 000 km/year:  
**0 kg**  
• Manufacturing pieces and equipment:  
**300 kg**

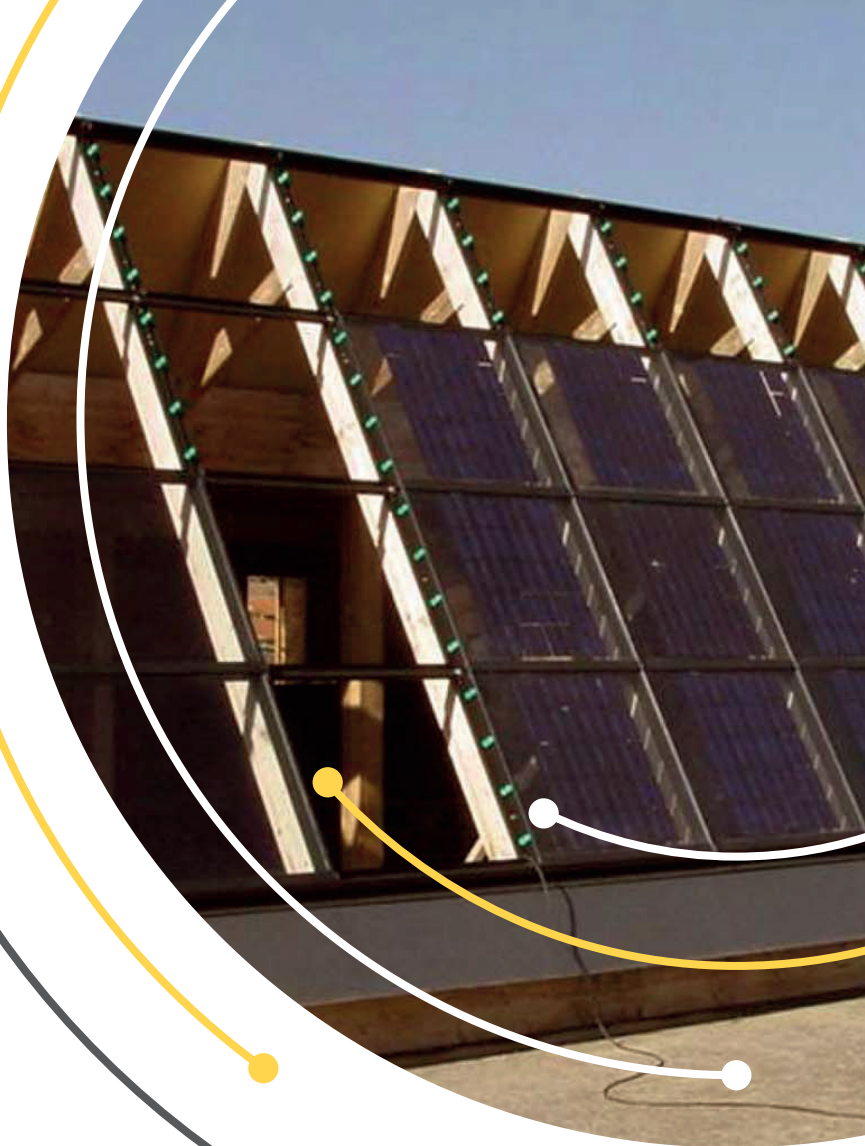
Manufacturer datas

**ANTHOS  
Air Power**  
— NORMANDIE —

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## SOLARSTYL® A CONTRIBUTION TO SUSTAINABLE DEVELOPMENT

The SolarStyl® system was developed as part of a project run by a subsidiary of the Aperam group, with the aim of creating a photovoltaic module installation system that guarantees the safety of people and property.

At the conference held in Beijing, the *International Stainless Steel Forum* awarded the first prize for sustainable development to Aperam for its SolarStyl® process that promotes the use of photovoltaics and contributes to sustainable development.

"The ISSF has praised the Aperam SolarStyl® system as promoting the use of photovoltaic energy and contributing to the development of renewable energies, reducing the cost of photovoltaic systems and increasing their performance."



## A NEW INSTALLATION SYSTEM FOR FACADE AND ROOF

Developed for the integration of photovoltaic modules on the roof or facade of buildings, the SolarStyl system can be used for the installation of stone claddings, canopies, individual heating systems, roof windows and green facades both in inside and outside.

Made by folding thin sheets of stainless steel, SolarStyl® is simple to install, lightweight and robust, able to withstand high climatic loads in pressure and depression.

A simple and robust flatness correction system allows the system to be installed on large roofs and remains watertight on slopes of 7 ° to 90 °.

Installed in double skin or in integration, in facade or roof of the buildings, the products developed under the SolarStyl® label contribute to the energy performance, by improving the thermal of the building, stake of the regulations RT 2012 and RT 2020.

**SolarStyl® is an innovative and patented BIPV\* system, whose structure is made of rails, frames and integrated connectors, suitable for any type of photovoltaic modules for a simple, reliable and secure integration on all types of roofs and facades.**

*\*BIPV = Building Integrated PhotoVoltaic*



## PERFORMANCE, ECONOMIC AND AESTHETICS

Combining exceptional mechanical performance, simple installation of photovoltaic modules and the security of installed systems, SolarStyl offers an excellent quality / price ratio.

Whatever the type of building, SolarStyl improves the aesthetics.

The structure is particularly well suited for the renovation of roofs in classified sites.

The different types of modules can be associated on the same surface while keeping the continuity in connectivity and aesthetics.

The product consists of a set of rails and sleepers, lightweight and rigid, easy to install.

Particular attention has been paid to the security of property and people. SolarStyl® is a plug & play system, it is equipped with an automatic equipotential connection.



- Metallic mass and modules photovoltaic: 13kg / m<sup>2</sup>;
- Peak power of the modules: 150 to 200 W / m<sup>2</sup>;
- Mechanical resistance, test from ruin to depression: 470 kg / m<sup>2</sup> (4600 Pa), air flow > 250 km / h, no deformation plastic system;
- able to support 600 kg / m<sup>2</sup> in pressure or depression;
- Tightness tested for a pressure 2400 Pa, an air flow 225 km / h, a flow of water 3 L / min / m<sup>2</sup>, and no leaks found on the underside;
- Tests carried out by the CEBTP.

ANTHOS  
Air Power

— NORMANDIE —

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### WASTE AND BIOMASS VALORISATION

- Solid urban waste;
- Hospital waste;
- Medicines;
- Automotive grinding residues;
- Industrial sludge;
- Wastewater;
- Wood;
- Green waste;
- Papers;
- Cartons;
- Plastics;
- Tires;
- Agro-food waste;
- Industrial waste;
- Animal droppings...



## WASTE RECYCLING AND VALORISATION BY PYROLYSIS

Finding appropriate treatment technologies for cleaning contaminated soils or landfill sites isn't easy.

The available technologies are usually very expensive. As the needs and costs of effective procedures for cleaning up contaminated areas are high, researchers investigated soil cleaning processes and analyzed the best solutions to be applied.

Recovery techniques are distinguished in the fields of biological, chemistry, physics and thermal according to the methodologies used.

Among many technologies studied, pyrolysis (a process of thermal decomposition of organic elements by flash heating to nearly 1000°C without oxygen) appears as a cost-effective and respectful approach to waste treatment and recovery.

## EFFICIENT AND ECOLOGICAL TECHNOLOGY

The GENIO project is based on the EPGS « Efficient Pyro-Gasification System », a unique technology developed and patented by SYNECOM, to transform waste into energy (heat and electricity) or other valuable products such as gas, liquid fuel, chemicals, fertilizer, etc.

The EPGS is designed to adapt easily to various different applications thanks to its compact size (200m²), transportable (the EPGS is also proposed in container thus avoiding civil works), modular (additional reactors and pre- and post-treatment stations can be added to the basic solution) and an evolutionary design that makes it extremely flexible:

the perfect solution to meet the needs of customers depending on the nature and quantity of waste to be treated or the production requested, all with a minimal impact on the environment (tests revealed CO<sub>2</sub> emissions below 300kg / T, 70% less than current techniques).

Pyrolysis is a process that consists in breaking down organic materials into simple molecules without any oxygen supply. This technique has the advantage of not forming harmful compounds. The polluting particles remain in the residues that form at the end of the process.

The system uses a process that transfers heat directly into the core of the raw material in an anaerobic environment, using steel balls with a temperature ranging from 450C° to 1050C°.

This makes it possible to transform up to 95% of the organic material into a production of synthesis gas. Energy consumption accounts for only 10% to 20% of the procedure.



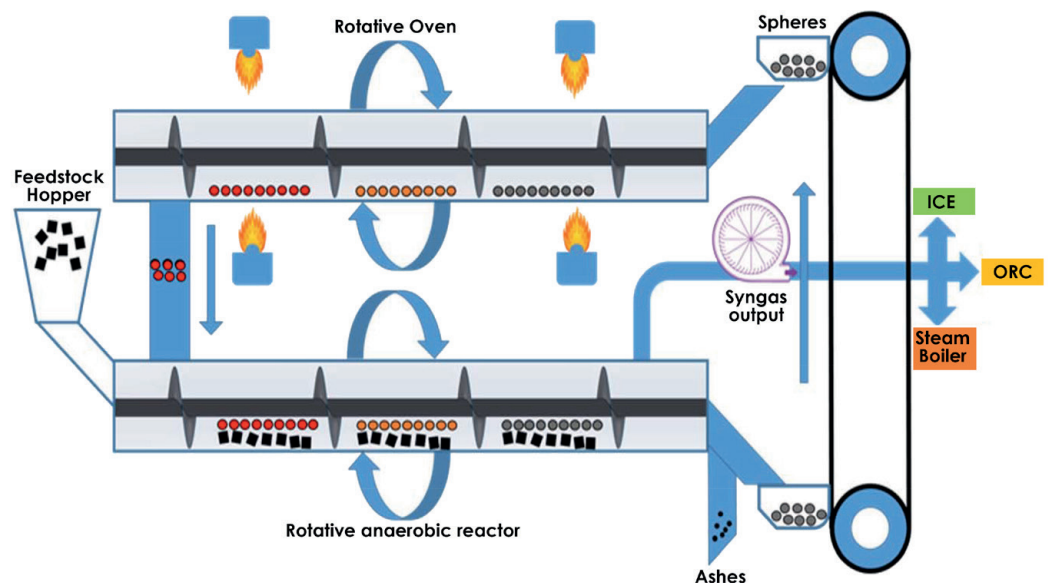
## EXAMPLE SPECS FOR 1T/H SYSTEM

### Dimensions:

from 200 to 400m² (3 containers or skid)

### Energy production:

- 1T of tires = 1.6MWh electric
- 1T of tires/plastics = 600kg oil
- 1T of wood = 1.1MWh electric
- 1T of domestic waste = 900kWh electric



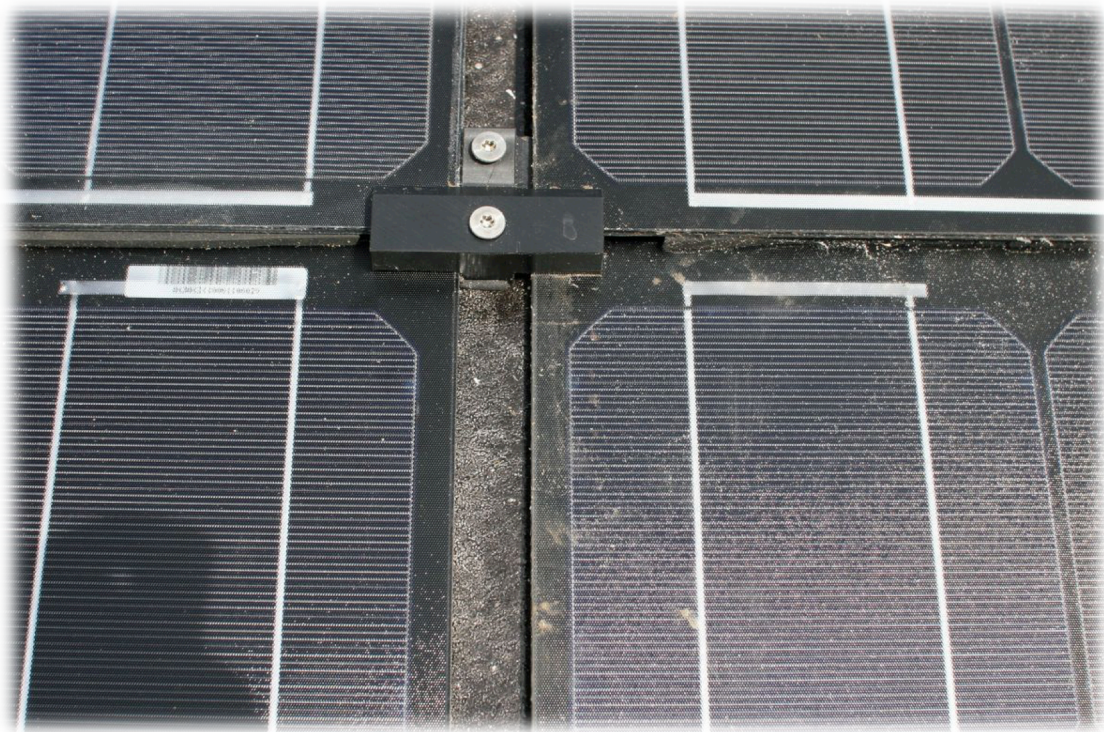
**GENIO**  
innovative outputs

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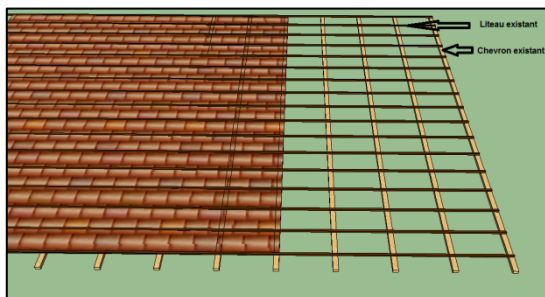
## *Guidelines for Installation*

*Accro'sun Composite Integration System® for  
photovoltaic systems on rooftop photovoltaic  
system*



### Steps to install the Accro'Sun integration system

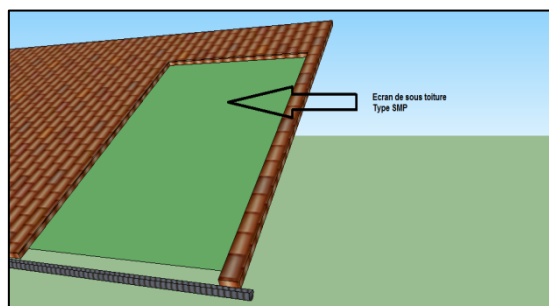
#### ➤ Step 1 : Structure of the existing frame



The system can be adapted to conventional rooftops based on rafters and battens, upon which tiles are placed.

**Text on image : Existing battens, existing rafters**

#### ➤ Step 2 : Placing the below-roof screen

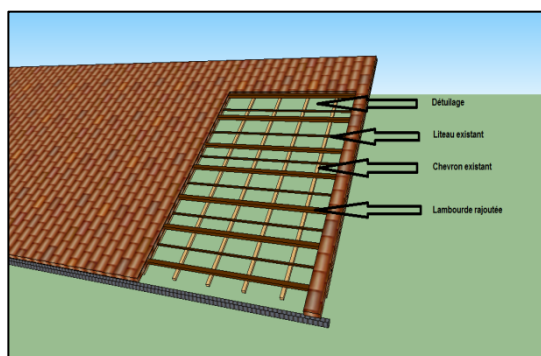


A below-roof screen (with a 10-year guarantee is required and must be placed in accordance with the state of the art on the rafters.

**Note** : The rest of the assembly will be explained without this below-roof screen for ease of comprehension.

**Text : SMP-type below-roof screen**

#### ➤ Step 3 : Placing the battens

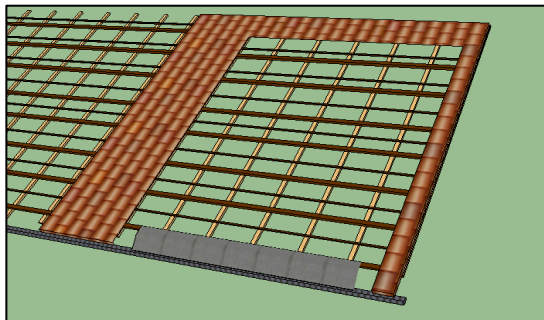


Adding the horizontal battens. These battens serve multiple functions:

- They structurally reinforce the roof.
- They are placed at the vertical centre-line of the panels

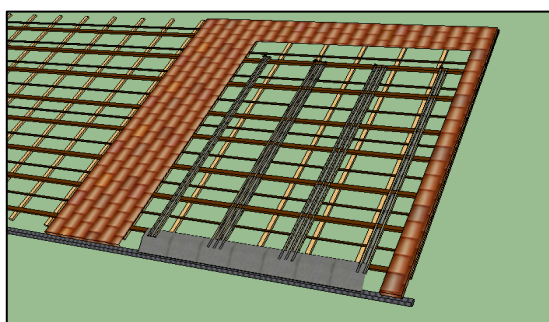
**Text : removing tiles, existing battens, existing rafters**

➤ **Step 4 : Putting in place the eaves flashing.**



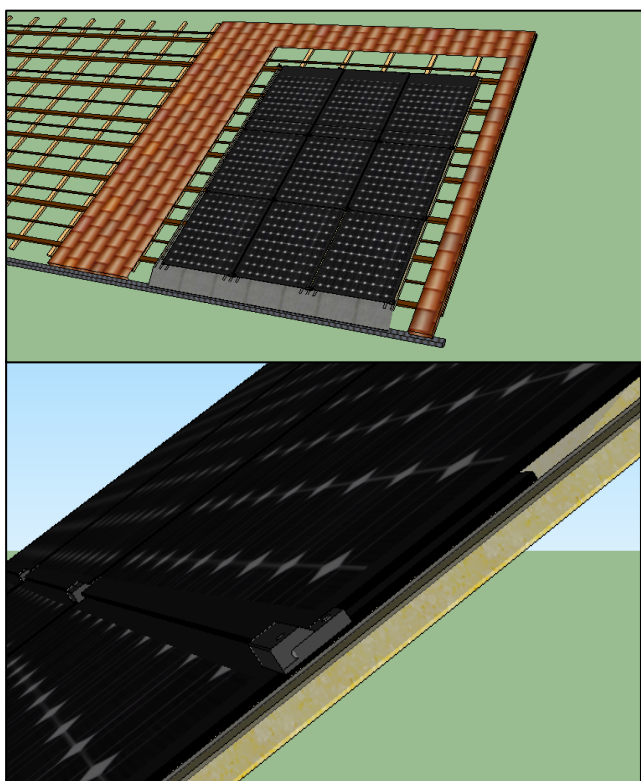
Drainage strip edges or eaves flashing : This ensures the waterproof sealing between the lower panels and the gutter. In case of partial cover, the verge flashing rests below the tiles.

➤ **Step 5 : Placing the Onduline polycarbonate rails**



These will be installed along the centre-line of the panels used and will rest on the drip edge.

➤ **Step 6 : Mounting the panels**



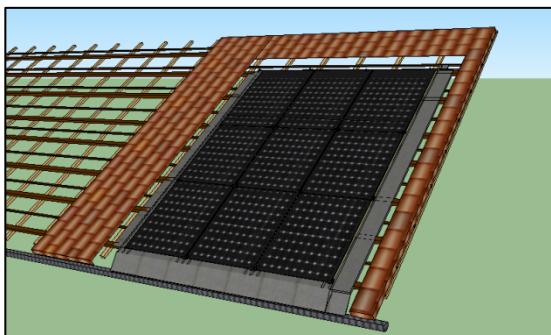
Placing the polyethylene hooks: We can mount the columns of panels starting from the left, from the right or even from the middle. The system may, to a certain extent, compensate for any problems with the squareness or non-linearity of the roof. The placement of the hooks ensures that the upper panel overlaps the lower panel (there is no gap between panels). An EPDM joint sealant foam is applied to the polycarbonate gutter at the point of overlap in order to ensure perfect sealing against powdery snow.

Placing the photovoltaic panels on the Ondulin polycarbonate rails.

**Note** : The hooks on the lower installation panels are fixed to the drip edge and the Ondulin polycarbonate rails.



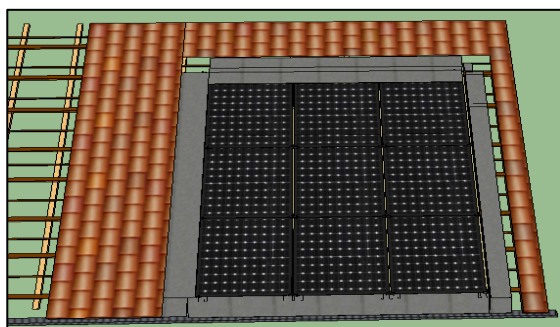
➤ ***Step 7 : Placing the lateral flashing***



**Lateral flashing sheet:** This acts as a bridge between the polycarbonate rail and the lateral tile. Its profile is compliant with the state of the art.

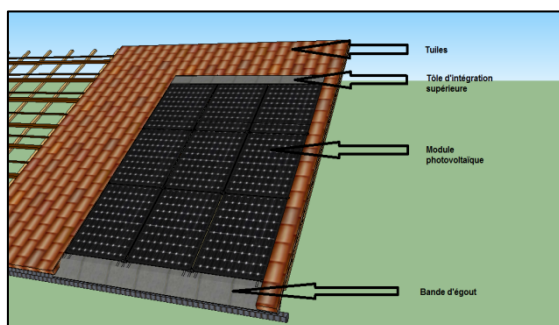
**Upper corner flashing sheet:** This ensures the waterproof sealing between the upper flashing and the lateral flashing.

➤ ***Step 8 : Placing the upper flashing***



Single sheet or Ubiflex waterproofing strip covering the panels.

➤ ***Step 9 : Placing the tiles***

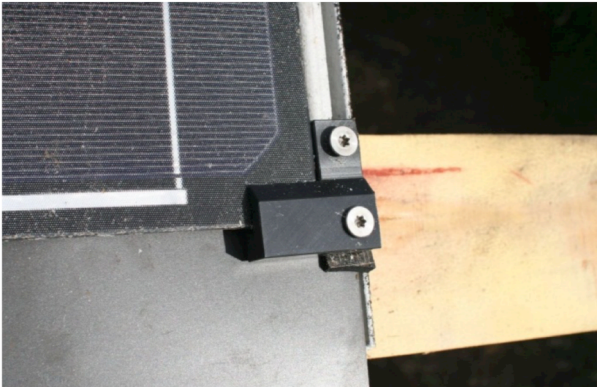


The tiles cover the lateral flashing and the upper integration sheet. They are placed on the battens and come up to the same level as the photovoltaic panels, strictly complying with CEIAB recommendations.

Tiles  
Upper integration sheet  
Photovoltaic module  
Drainage strip

### Examples of installations

Detail of a photovoltaic installation in Cantal





Installation in Cantal using the Accro'sun Composite system :

⇒ Slate roof



⇒ Photovoltaic rooftop



> Felletin railway station (Cantal, France)









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## *ENERGY INVESTMENTS*

# INTRODUCTION

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**LENIUM** provides fully integrated solutions for the successful implementation of solar photovoltaic and biomass projects. At the heart of this solution is the deep knowledge of the industry in Europe and the trajectory of our associated EPC partner (engineering, procurement and construction), **FEINA**, that has more than 28 years of experience in the industry. **FEINA** was born as one of the first Spanish companies specializing in renewable energies. **LENIUM** is able to perform a complete EPC service in all phases of the value chain, including:

- **ENGINEERING:**  
We design solar plants with optimum photovoltaic, wind, biogas and biomass performance and aimed at achieving the most affordable level of electricity in any region of the world.
- **HIRING AND PURCHASING:**  
We are able to negotiate and supply technology through suitable suppliers and services for your project in the best market conditions.
- **PROJECT MANAGEMENT:**  
From A to Z: we plan the whole process taking care of every detail to guarantee an optimal completion of the project.
- **CONSTRUCTION:**  
We manage selected contractors to complete the project, ensuring the highest level of quality in terms of time and costs, in full compliance with local standards.
- **COMMISSIONING:**  
**LENIUM** performs several commissioning tests to ensure that each plant operates as designed and is 100% compliant.

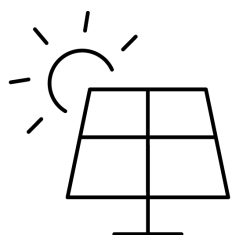


# PROJECTS

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**Our extensive knowledge of the renewable energy sector at the international level, as well as the fact that our members have more than 25 years of experience in the field, allow us to offer fully integrated solutions for the successful development and implementation of renewable energy projects designed for self-consumption, self-production, sale in net, or sale to the industrial sector.**

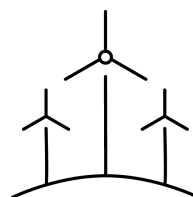
**We work with several different kinds of energy:**



***Solar Energy***  
***Small Hydro***



***Biomass***



***Wind Energy***  
***Energy Efficiency***



**Our EPC service fully encompasses all phases of the value chain, including:**

**ENGINEERING:** Design of photovoltaic, wind, biomass, and small hydro power plants designed to maximize efficiency.

**HIRING AND PURCHASING:** Negotiation and supply of technology through suppliers and services selected for each project.

**PROJECT MANAGEMENT:** Planning and management of the entire process. We take care of every detail to ensure optimal project completion.

**CONSTRUCTION:** Selection and management of contractors to execute projects with the highest quality guarantees in terms of time, costs and full compliance with local regulations.

**COMMISSIONING:** Development of several commissioning tests to control that each plant operates as designed and is fully compatible.

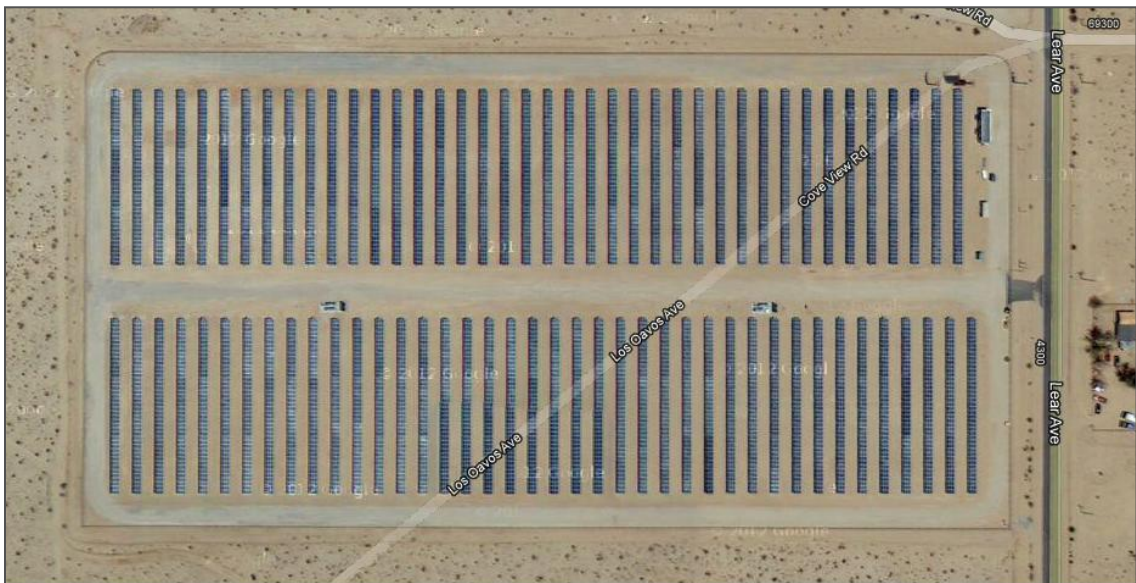
## Some of our projects

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**With a portfolio of 200+ completed projects and a total accumulated power of more than 30 MW, LENIUM group is a leading project management firm in the renewable energy sector and in R&D (Research and Development).**

**We manage and execute our renewable energy projects in their entirety, from conception to completion, through technical development, obtaining permits and licenses, turnkey execution, O&M (operation and maintenance), and financing.**

**Our goal is to make international renewable energy projects possible.**



**2,3 MW - Mojave Desert – Nevada - USA**

Technology used: Solar PV on 1 axis solar trackers

# ABOUT LENIUM

---

**28**

**Years of  
experience**

**19**

**Countries**

**220**

**Projects**

**+30**

**MW  
Installed**







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