Introduction:

SITECNO solar energy kit is hybrid PV system with batteries or off grid applications, which provide energy in all unforeseen circumstances. A complete solution which generates electrical energy from sun light for self-consumption and feed surplus energy in to the batteries and also in to the grid as per legislation of the country. Solar PV panels generates DC electric power when exposed in sun light. High efficiency MPPT Hybrid PV inverter converts DC electric power in to AC electric power for consumption in load. Grid power supply is connected in parallel circuit with PV inverter AC output. Solar generated electric power has first priority for consumption in load and surplus power store in battery bank. If load is higher than solar generation power than additional power can be retrieved from the grid supply if required. If the grid is off or unstable than additional power will be retrieved from the battery bank. Different battery bank packages are available. Solar energy system can be hybrid with diesel generator for the operation as PV-diesel hybrid system. Solar energy system is useful for saving in electricity bill, saving in diesel fuel consumption and source of income by selling surplus energy to the grid.

PV System output:

- 2500 Wp Solar hybrid Kit PV Power
- 12 kWh Energy generation per day (average)
- 360 kWh Energy generation per month (average)
- 3816 VAH 1 Hour full load backup battery bank

Equipment and components list:

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>250 Wp Solar photovoltaic Si-polycrystalline panels</td>
</tr>
<tr>
<td>1</td>
<td>3 kW Solar hybrid TL inverters with built-in battery charge controller</td>
</tr>
<tr>
<td>6</td>
<td>53 Ah Battery bank power.com AGM (GEL-ESS) 12V @C10 or equivalent</td>
</tr>
<tr>
<td>10</td>
<td>unit Aluminium support structure for solar panels</td>
</tr>
<tr>
<td>50</td>
<td>m DC cables 6mm R1000 PV panel to inverter</td>
</tr>
<tr>
<td>4</td>
<td>m DC cables R1000 battery to hybrid inverter</td>
</tr>
<tr>
<td>6</td>
<td>m DC cables battery interconnection</td>
</tr>
<tr>
<td>6</td>
<td>unit DC cables battery interconnection thimble</td>
</tr>
<tr>
<td>5</td>
<td>m AC cable 2 core inverter to main breaker</td>
</tr>
<tr>
<td>6</td>
<td>pair Solar connector MC4</td>
</tr>
<tr>
<td>1</td>
<td>set Aluminium support structure installation tools</td>
</tr>
<tr>
<td>1</td>
<td>set Instructions manual for installation</td>
</tr>
<tr>
<td>1</td>
<td>set Electrical design layout</td>
</tr>
</tbody>
</table>

SYSTEM WARRANTY:

- Solar modules production: 25 years
- Aluminium support structure: 10 years
- Inverters: 3 years standard, (extendible to 25 years)
- Battery: GEL: 2 years (life 10 years) / AGM (GEL -ESS): 1 year (life 15 years)

Quality of Components:

Manufactured in EU.
All components in the kit are high quality with CE standard.
**Kits advantages**

- Easy to organize the order through a unique code and provider.
- Compatibility between all components secured.
- Measurement of energy flows installation.
- CE highest quality components.
- Aluminium support structure with pre-design to facilitate plug & play mounting installation.

**Function of the system**

1. The load consume the solar energy produced by photovoltaic modules during the day hours time, plus the excess energy can be stored in to batteries and also feed in to the grid as per legislation of the country.

2. The diesel generator connection is an other option when the load does not get enough solar energy, battery bank is at low level and there is instability in the grid supply network. In these situations the customer consumes energy from diesel generator.

3. Battery bank can be increased according to the requirement of autonomy time.

**Modular system**

These systems are modular type and can be installed as per your space and requirement. You can ask for additional services as state-of-the-art designing, drawings, engineering and installation of your projects.

Solar kits with modular system can be extended to MW size projects.

**Solar Kit Applications**

- Schools
- Restaurants
- Gymnasium
- Gardens
- Markets
- Electric vehicle charging stations
- Administration buildings
- Hospitals
- Resorts
- Service centres
- Multi story buildings
- Shopping malls
- Parking Areas
- Hotels
- Scout camps
- Petrol Stations
- Old houses
- Public service offices

**Additional Accessories**

Ask for additional accessories for extension at your installation or shifting of your PV system to another place.

**Installation Training Services**

Training of installation is offered for technical persons on time to time basis. Schedule of the training session announce on web site.

**Operation and maintenance services**

Operation and maintenance services offered for the valued customers for efficient operation of the system. Customers may ask for O&M service contract with the company.

**Monitoring services**

In order to monitor solar power generation and consumption from PV system, data can be transmitted to remote locations. For communication between the solar inverter and monitoring devices, SITECNO provides two basic choices: Wireless or Blue-tooth and wired variants.
INSTALLATION APPLICATION

- Solar system with batteries and hybrid with external generator (on grid)
- Solar system hybrid with batteries (off grid)
- Solar system with batteries and hybrid with external generator (off grid)

ANNUAL ENERGY PRODUCTION by SOLAR ENERGY KIT MODEL: SEM-CS2500

(Annual global direct irradiation 2.97 kWh/m² in Madrid. Ref: source NASA-SSE)
1. Photovoltaic modules
2. Inverters
3. Batteries
4. Consumption
5. Diesel generator
6. Grid

SINGLE LINE ELECTRICAL DIAGRAM

SCHEMATIC DIAGRAM FOR PV PANEL + DIESEL GENERATOR + BATTERY + GRID

SCHEMATIC DIAGRAM FOR PV PANEL + DIESEL GENERATOR + BATTERY

SCHEMATIC DIAGRAM FOR PV PANEL + BATTERY
SITECNO Solar Photovoltaic Panels stand for quality, durability and most importantly, high performance. Our experience, capacity of research, continuing development and improvement have turned us into a company recognized in the sector by the high value offered to our clients.

Due to their engineered hollow section frame and its 4mm special textured glass with AR coating, SITECNO modules meet the maximum demands with regard to stability and corrosion resistance.

Thanks to their high performance SITECNO modules are prepared for changes in legislation. These panels will produce 5% more than any other of the same features.

The performance warranty is for 25 years, after 12 years, modules still produce a minimum 90% of their nominal performance. After 25 years module still produce a minimum 80% of their nominal performance.

### Electrical Characteristics:

<table>
<thead>
<tr>
<th>MODEL</th>
<th>SI-60P250</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Power (Pmax)</td>
<td>250W</td>
</tr>
<tr>
<td>Open Circuit Voltage (V_{OC})</td>
<td>37,5V</td>
</tr>
<tr>
<td>Short Circuit Current (I_{SC})</td>
<td>8,76A</td>
</tr>
<tr>
<td>Voltage at Nominal Power (V_{mp})</td>
<td>30,3V</td>
</tr>
<tr>
<td>Current at Nominal Power (I_{mp})</td>
<td>8,24A</td>
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<tr>
<td>Module Efficiency (%)</td>
<td>15,20</td>
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</tbody>
</table>

### Mechanical Characteristics:

<table>
<thead>
<tr>
<th>Cell type</th>
<th>Polycrystalline156x156mm</th>
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<tbody>
<tr>
<td>Number of cells</td>
<td>60 (6x10)</td>
</tr>
<tr>
<td>Module dimension</td>
<td>1660 x 990 x 50mm</td>
</tr>
<tr>
<td>Weight</td>
<td>20kg</td>
</tr>
<tr>
<td>Front cover</td>
<td>TSG low-iron tempered glass</td>
</tr>
<tr>
<td>Frame</td>
<td>Aluminium alloy</td>
</tr>
<tr>
<td>Junction box</td>
<td>IP65, 3diodes</td>
</tr>
<tr>
<td>Cable length</td>
<td>1200mm (+) , 800mm(-)</td>
</tr>
<tr>
<td>Connector</td>
<td>PV-JM601</td>
</tr>
</tbody>
</table>

### Temperature Coefficients:

| Nominal Operating Cell Temperature     | 25°C ±2°C       |
| Temperature Coefficients of Pmax       | -0.43% / °K     |
| Temperature Coefficients of Voc        | -0.31% / °K     |
| Temperature Coefficients of Isc        | 0.04% / °K      |
| Operating Temperature                  | -40 °C to +85 °C|
| Maximum System Voltage                 | 1000V DC        |
| Reverse current load                   | 15A             |
The SUN STORAGE 1Play battery inverter generates an off-grid AC network and manages the power achieving an optimum balance between production, storage and consumption. To do so, it controls all the time the energy flow between the grid and the batteries.

This new inverter features 4 operating modes:

**Stand-alone mode:**
The inverter generates an AC grid and the renewable energy source is used to feed the loads and to charge the batteries. The auxiliary source (a diesel gen-set or the public grid) is only connected when the batteries’ state of charge is lower than certain threshold. As a special operating case, it is possible to implement the Direct Panel Mode, for those installations without an energy storage system. In this mode, the system only operates when the solar resource is available.

**Back-up mode:**
The battery inverter is connected to the public grid when it is present. Thus, if there is an energy surplus, it could be injected into the grid. The energy stored would only be used when the public grid is not available. This mode makes it possible to implement peak shaving strategies in order to reduce the contracted power.

**Self-consumption mode:**
The inverter operates as a grid-tied one. If there is an energy surplus, it will be used to charge the batteries or it may be injected into the grid if the batteries are fully charged. If the loads demand more energy than the one produced by the renewable source, the batteries will satisfy the demand, increasing the self-consumption ratio. This mode makes it possible to implement peak shaving strategies in order to reduce the contracted power.

**Grid support mode:**
In combination with the EMS Manager, the battery inverter is able to adapt the output power from the PV plant to a pre-established value in order to maintain a constant power output or to control the ramp rate.

**PROTECTIONS**
AC over voltages.
Insulation faults.
Output short circuits and overloads.

**OPTIONAL ACCESSORIES**
Inverter communication via RS-485 and Ethernet.
PV input.
DC switch for the PV field.
AC pre-charge system.

**ACCESSORIES SUPPLIED AS STANDARD**
- 2 configurable potential-free outputs, some for the connection and disconnection of the back-up gen-set.
- Battery temperature measurement circuit built-in. PT100 (3-wire) needed.
- DC pre-charge system.
PV INVERTER TECHNICAL SPECIFICATION

**PV Input (DC)**
- PV array max. power: 6.5 kWp
- Voltage range MPP: 300 - 450 V
- Voltage range (1): 300 - 550 V
- Maximum current: 20 A
- Inputs: 2
- MPPT: 1

**Battery Input (DC)**
- Rated Battery voltage (2): 48 - 300 V
- Extended battery voltage (3): 48 - 420 V
- Minimum operation voltage (2): 40 V
- Maximum charge / discharge current: 50 A
- Battery type: Lead, Ni-Cd, Li-ion

**Generator / Grid Input (AC)**
- Rated voltage: 230 V
- Voltage range: 172 - 264 V
- Rated frequency: 50 / 60 Hz
- Frequency range: 40 - 70 Hz
- Charge current range: 0 - 13 A
- Generator or grid maximum power: 11,500 W

**Output (AC)**
- Rated power (4): 3 kW
- Power (25 ºC) 30 min, 2 min, 3 s (5): 3,500 / 3,900 / 5,080 W
- Current: 13 A
- Rated voltage (6): 220 - 240 V
- Rated frequency (6): 50 / 60 Hz

**Efficiency**
- Maximum efficiency: 95.5%

**General Information**
- Stand-by consumption: <10 W
- Ambient temperature: -20 ºC to +65 ºC
- Relative humidity (non-condensing): 0 - 95%
- Protection class: IP65
- Compliance with standards: EN 61000-6-1, EN 61000-6-2, EN 61000-6-3, EN 61000-6-4, EN 61000-3-12, EN 61000-3-11, EN 62109-1, EN 62109-2, IEC62103, EN 50178, SDIN V VDE V 0126-1-1, EN 50438, CEI 0-21, VDE-AR-N 4105:2011-08, G59/2, G83/2(7), AS4777.2, AS4777.3, IEC 62116, IEC 61727, UNE 206007-1, ABNT NBR 16149, ABNT NBR 16150, South African Grid code, IEEE 929, Thailand MEA & PEA requirements.

Notes: (1) Must not be exceeded under any circumstances. Consider the voltage increase of the 'Voc' at low temperatures (2) The inverter's maximum power will be the battery voltage multiplied by the maximum discharge current (50 A) (3) Only possible if PV energy is not present (4) AC power up to 40 ºC ambient temperature (5) This power is only available if the battery voltage multiplied by the maximum discharge current reaches these values (6) This parameter is configurable through the display (7) Related only to inverters up to 16 A.
The OPzV bloc solar.power batteries are sealed stationary batteries with fixed electrolyte in gel. The construction as sealed batteries makes OPzV bloc solar.power batteries maintenance free relating to re-filling of water.

Using tubular plates in combination with gauntlets at their positive tubular plates, OPzV bloc solar.power batteries offer an extreme high cycling expectancy. So they are optimal for application in sectors with high charge and discharge operation load like solar and off-grid applications. The electrolyte of OPzV bloc solar.power batteries is fixed in gel what causes even the option of a horizontal assembly (optional).

The shock resistant and strengthened Polypropylene housing offers an easy to clean surface and is resistant against all established cleaners. The flat lid with its integrated handle guaranties a very good handling and an easy assembly.

HOPPECKE batteries of the OPzV bloc solar.power type series have a cycling expectancy from up to 4500 discharges with 30% discharge level.

Your benefits with OPzV bloc solar.power batteries
- **Maximum cycle stability and durability** in particular during PSoC operations
- **Minimum maintenance costs with maximum safety** maintenance-free due to sealed Gel-technology
- **Highest reliability** for remote off-grid applications
- **High resistance against mechanical stress** reinforced impact-proof polypropylene housing
- **Highest project flexibility** provided by excellent stocking capability
- **Optimal environmental compatibility** - Closed loop for recovery of materials in an accredited recycling system

**Type of Battery:**

| Standards: | IEC 60896, IEC 61427, DIN 40744 |
| Capacity Range: | 70-370 AH |
| Normal Voltage range: | 12V/6V |
| Container Material: | PP, talcum |
| Grid alloy (+ive, -ive) | Pb + <1% Ca |
| Plates (+ive, -ive) | Tubular, Grid |
| Electrolyte: | H2SO4, GEL |
| Application: | Solar |
| Connector design: | bolted connector |
| Design life up to | 10 years |
| Cycles up to @ 30% DoD: | 1.300 |
| Operating temperature: | -20°C to +40°C |

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Capacity</th>
<th>Weight</th>
<th>Size (L X W X H)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 V</td>
<td>70 AH</td>
<td>40 Kg</td>
<td>272 X 206 X 283</td>
</tr>
<tr>
<td>12 V</td>
<td>120 AH</td>
<td>52.5 Kg</td>
<td>272 X 206 X 283</td>
</tr>
<tr>
<td>12 V</td>
<td>180 AH</td>
<td>75.5 Kg</td>
<td>380 X 206 X 383</td>
</tr>
<tr>
<td>6 V</td>
<td>250 AH</td>
<td>51 Kg</td>
<td>272 X 205 X 383</td>
</tr>
<tr>
<td>6 V</td>
<td>300 AH</td>
<td>66 Kg</td>
<td>380 X 206 X 383</td>
</tr>
<tr>
<td>6 V</td>
<td>370 AH</td>
<td>73 Kg</td>
<td>380 X 205 X 383</td>
</tr>
</tbody>
</table>
SOLAR BATTERY POWER.COM AGM (GEL-ESS TECHNOLOGY)

HOPPECKE power.com SB batteries are based on using flat plate technology and fixing the electrolyte inside glass mats (AGM) which even take the separating function. The high energy density of HOPPECKE power.com SB batteries causes small footprint and a very good use of space. The central degassing integrated in the battery lid can, by using optional tubes, be used to carry out all occurring gases. The flat lid with integrated handle and the easy to clean surface guaranty an easy and comfortable handling by assembly as well as in operation. Optional this battery even can be delivered for horizontal assembly.

This characteristic of HOPPECKE power.com SB batteries makes HOPPECKE power.com SB batteries usable in a wide applications spectrum. Mostly HOPPECKE power.com SB batteries are used in emergency current-, IT/ Telecom- and safety light applications.

HOPPECKE power.com SB batteries offer a design life from more then 12 years and are classified as “Long Life” following EUROBAT.

Your benefits with HOPPECKE power.com SB
- Maintenance-free regarding water refilling - Due to innovative GEL-ESS technology
- Good high-current capability
- Low investment costs due to innovative electrode structure
- Optimal space utilization - due to horizontal arrangement
- Optimum operational safety
- Integrated backfire protection and central degassing system
- Higher short-circuit safety even during the installation - Based on HOPPECKE system connectors
- Easy assembly and installation - battery lid with integral handle

**Type of Battery:** power.com SB

**Standards:** IEC 60896, IEC 61427, DIN 40744

**Capacity Range:** 50-600 AH

**Normal Voltage range:** 12V/6V/2V

**Container Material:** PP, talcum

**Grid alloy (+ive, -ive):** Pb + <1% Ca

**Plates (+ive, -ive):** Tubular, Grid

**Electrolyte:** H₂SO₄, AGM

**Application:** Solar

**Connector design:** bolted connector

**Design life up to:** 15 years

**Cycles up to @ 30% DoD:** 1,000

**Operating temperature:** -20°C to +40°C

**Voltage** | **Capacity** | **Weight** | **Size (L X W X H)**
---|---|---|---
12 V | 50 AH | 26 Kg | 229 X 177 X 230
12 V | 60 AH | 26.5 Kg | 229 X 177 X 230
12 V | 80 AH | 37.5 Kg | 344 X 177 X 230
12 V | 100 AH | 38 Kg | 344 X 177 X 230
12 V | 110 AH | 52 Kg | 498 X 177 X 230
12 V | 130 AH | 52.5 Kg | 498 X 177 X 230
12 V | 140 AH | 54.5 Kg | 242 X 170 X 275
KIT COMPONENTS

**Design:**
- **Modular type**
- Technical feature:
  - Aluminium
  - 10 years warranty
  - Tamper proof nut bolt
  - 100% recyclable material
  - A2 Stainless steel bolts
- Weight: 2.49kg/m
- Loads: wind, snow
- Test certificate: CE Certifies

**Cable:**
- Model: SI-MC4-F
- Rated Voltage: TUV 1500V DC / UL 600V DC
- Rating Current: 20-30A
- Cable Size: 2.5-4.0-6.0, 10-12-14AWG
- Proof Voltage: TUV 1500V AC, 1 min
- Protection Class: Class II
- Temperature Range: -40 to 85°C
- Flame class: UL94-V0

**Connector:**
- Flexible conductor: class 5
- Maximum service temperature: 120°C
- Estimated lifetime: 30 years.
- UV Resistant UV Resistant
- Grease & mineral oils resistance: excellent
- Grease & mineral oils resistance: excellent
2500 W SOLAR ENERGY HYBRID KITS

Complete systems including all accessories with following options

<table>
<thead>
<tr>
<th>REF#</th>
<th>MODEL#</th>
<th>Option details:</th>
</tr>
</thead>
<tbody>
<tr>
<td>19001</td>
<td>SEM-3E0HNS2500</td>
<td>-without battery and without aluminium support structure</td>
</tr>
<tr>
<td>19101</td>
<td>SEM-2E0HNS2500</td>
<td>-without batteries</td>
</tr>
<tr>
<td>19201</td>
<td>SEM-1E1HAS2500</td>
<td>-AGM (GEL-ESS) battery backup 1 hour and without aluminium support structure</td>
</tr>
<tr>
<td>19301</td>
<td>SEM-1E2HAS2500</td>
<td>-AGM (GEL-ESS) battery backup 2 hours and without aluminium support structure</td>
</tr>
<tr>
<td>19401</td>
<td>SEM-1E3HAS2500</td>
<td>-AGM (GEL-ESS) battery backup 3 hours and without aluminium support structure</td>
</tr>
<tr>
<td>19501</td>
<td>SEM-1E4HAS2500</td>
<td>-AGM (GEL-ESS) battery backup 4 hours and without aluminium support structure</td>
</tr>
<tr>
<td>19601</td>
<td>SEM-1E5HAS2500</td>
<td>-AGM (GEL-ESS) battery backup 5 hours and without aluminium support structure</td>
</tr>
<tr>
<td>19701</td>
<td>SEM-1E1HGS2500</td>
<td>-GEL battery backup 1 hour and without aluminium support structure</td>
</tr>
<tr>
<td>19801</td>
<td>SEM-1E2HGS2500</td>
<td>-GEL battery backup 2 hours and without aluminium support structure</td>
</tr>
<tr>
<td>19901</td>
<td>SEM-1E3HGS2500</td>
<td>-GEL battery backup 3 hours and without aluminium support structure</td>
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<tr>
<td>20001</td>
<td>SEM-1E4HGS2500</td>
<td>-GEL battery backup 4 hours and without aluminium support structure</td>
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<td>20101</td>
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<td>-GEL battery backup 5 hours and without aluminium support structure</td>
</tr>
<tr>
<td>20201</td>
<td>SEM-C1HAS2500</td>
<td>-AGM (GEL-ESS) battery backup 1 hour</td>
</tr>
<tr>
<td>20301</td>
<td>SEM-C2HAS2500</td>
<td>-AGM (GEL-ESS) battery backup 2 hours</td>
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<tr>
<td>20401</td>
<td>SEM-C3HAS2500</td>
<td>-AGM (GEL-ESS) battery backup 3 hours</td>
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<td>20501</td>
<td>SEM-C4HAS2500</td>
<td>-AGM (GEL-ESS) battery backup 4 hours</td>
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<tr>
<td>20601</td>
<td>SEM-C5HAS2500</td>
<td>-AGM (GEL-ESS) battery backup 5 hours</td>
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<tr>
<td>20701</td>
<td>SEM-C1HGS2500</td>
<td>-GEL battery backup 1 hour</td>
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<tr>
<td>20801</td>
<td>SEM-C2HGS2500</td>
<td>-GEL battery backup 2 hours</td>
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<td>SEM-C3HGS2500</td>
<td>-GEL battery backup 3 hours</td>
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<tr>
<td>21001</td>
<td>SEM-C4HGS2500</td>
<td>-GEL battery backup 4 hours</td>
</tr>
<tr>
<td>21101</td>
<td>SEM-C5HGS2500</td>
<td>-GEL battery backup 5 hours</td>
</tr>
</tbody>
</table>

Solar Energy Kit Model Configuration:

- Model: SEM
- Kit type: C  complete kit with support structure
- Battery backup time: 0 0hours 1 1hours 2 2hours 3 3hours 4 4hours 5 5hours
- Inverter type: H Hybrid
- Battery type: N Non A AGM/Gel-ESS G GEL
- AC output phase: S 1phase 220 v M 3phase 220V T 3phase 400V
- Total PV panel power (W): 250 500 750 1000 1500 100K
- PV inverter: without transformer A with transformer
Your contribution to reduce $CO_2$ for sustainable earth