HYbrid Energy Solutions Ltd

Application:
- Site Loads up to 400 A possible (48 V DC)
- Recommended load factor is < 50% for optimum CapEx / OpEx balance
- Increased fuel efficiency can be achieved by reducing load factor further
  - There is NO MINIMUM LOAD

Genset Style Enclosure:
- 2200mm x 900mm x 1350mm (w x d x h)
- Folded steel panels
- Powder coated finish
- Three separate equipment compartments, engine compartment, electrical panel compartment and battery compartment
- Engine Compartment:
  - 3 doors
  - Forced ventilation
  - Acoustic insulation 75 dB @ 7m
- Electrical Panel Compartment:
  - 1 door
  - Sealed and insulated
- Battery Compartment:
  - 1 door
  - Sealed and insulated
  - Forced Ventilation
  - Fork lift pockets

Battery:
- Lithium Ion
- Light weight and compact
- Built in Battery Management System and safety disconnect
- Low maintenance, sealed for life construction
- 48V DC, 63 or 126 Ah Modules
- Up to 1,008 Ah capacity by connecting up to 8 modules in parallel
- 4 times longer cycle life than lead acid
- Very high charge and discharge capability
- ‘Hot Swap’ capability

Battery Management System:
- Up to 10 modules in parallel
- Self diagnostics
- Cell balancing
- Charge and discharge enable supervision and control
- State of charge, health, current, temperature, cell resistance monitoring
- Multiple strings of cells in parallel and series for battery redundancy*

Alternator:
- Permanent Magnet type
- Rated power up to 20kW*
- Thermal, Overcurrent and Overspeed protection
- Simple construction; 1 moving part, no bearings or sliding contacts
- Low voltage ripple
### System

<table>
<thead>
<tr>
<th>Feature</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel</td>
<td>- Perkins 404D-22&lt;br&gt;- 4 stroke indirect injection compression&lt;br&gt;- Diesel fuel&lt;br&gt;- 4 cylinder compact package&lt;br&gt;- Liquid cooled&lt;br&gt; 2.2 litre displacement&lt;br&gt;- Low fuel consumption, over wide range of speeds&lt;br&gt;- 500 hour service intervals</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Feature</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary Racor turbine filter*</td>
<td>- Increases fuel filter life where there is heavy fuel contamination</td>
</tr>
<tr>
<td>Water in fuel sensor*</td>
<td>- Shuts down engine safely if fuel is contaminated with water</td>
</tr>
<tr>
<td>Bypass oil filter with evaporation chamber*</td>
<td>- Removes contaminants and acidic by-products of combustion. Increases oil life. Ideal for areas with poor fuel quality&lt;br&gt;- Service interval up to 1,000 hours</td>
</tr>
<tr>
<td>Solar Array*</td>
<td>- Increase fuel efficiency by using solar energy to charge the battery pack and power the site load during the day</td>
</tr>
<tr>
<td>400 A rating*</td>
<td>- Peak loads of 400 A possible</td>
</tr>
<tr>
<td>All steel construction</td>
<td>- Secure and vandal resistant</td>
</tr>
<tr>
<td>Separate electrical, battery and engine compartments</td>
<td>- Different operating environments to suit the equipment therein</td>
</tr>
<tr>
<td>GPRS communication*</td>
<td>- Web based remote monitoring&lt;br&gt;- Remote fault diagnosis and repair&lt;br&gt;- Configurable to client’s requirements*&lt;br&gt;- Monitors HES performance and protects the equipment from damage in the case of a malfunction</td>
</tr>
<tr>
<td>Lithium Ion</td>
<td>- Built in Battery Management System&lt;br&gt;- Up to 1,008Ah capacity&lt;br&gt;- Longer life, Low maintenance&lt;br&gt;- High charge and discharge capabilities</td>
</tr>
<tr>
<td>Dry Weight</td>
<td>- 1160kg, with batteries</td>
</tr>
</tbody>
</table>

### Air Conditioning*

- Free air cooling unit, Thermosyphon<br>- DC air conditioner<br>- Hybrid free air cooling / DC air conditioner<br>- Up to 3,000 Watts cooling @ 48 V DC<br>- R134a Refrigerant<br>- Quiet (65 dB @ 1.5m)<br>- Variable speed compressor and fans<br>- Microchannel heat exchangers<br>- High efficiency

*Indicates optional equipment