The cleanest way to produce electricity from diesel

PowerCell’s fuel cell system converts road diesel to electricity in an energy efficient and environmentally friendly manner
System offering

PowerCell’s fuel cell system converts road diesel to electricity in an energy efficient and environmentally friendly manner, with minimal or no emissions and silent operations. The unit produces about 3kW of electric power.

PowerPac is a complete electric power-generating unit using ordinary low sulphur road diesel. The 3 kW PowerPac can be optimized for many applications and markets, and deliver clean power using existing fuel.

Not only is this technology more efficient than other products, it is also much cleaner. PowerPac produces only a fraction of the CO₂ that other comparable systems emit. It produces no particles or nitrogen-/sulphur oxides.

A fuel cell based Auxiliary Power Unit in a truck will:

- **Lower operating expenses:** The PowerPac enables trucks to produce electricity for climate control without running the engines when resting or loading/unloading.
- **Improve driver environment:** Powering of air conditioning is possible for the entire night. Reduced noise and vibrations from the system. No emissions leads to good air quality.
- **Reduce impact on the environment:** The PowerPac system produces electricity with no emission of NOx, CO and particles and with much less CO₂ exhausts.
- **An environmentally sustainable solution:** An increasing number of cities around the world are banning idling, and end customers start to demand green and environmentally sustainable solutions from their suppliers and partners.

A fuel cell based generator for powering of a telecom tower will:

- **Lower operating expenses:** Diesel is the lowest cost source of hydrogen and available even in remote areas. The PowerPac is typically 20-30 per cent more fuel efficient than a diesel generator with batteries. It requires no on-site maintenance. Exhausted components are easily replaced for a long operational life. It is an operationally effective choice in many situations.
- **Rationalize activities, inventory and systems:** The system is typically simpler than alternatives, and requires no on-site maintenance. Its components are not attractive to thieves. This allow support systems to be rationalized.
- **Environmentally friendly:** Low noise, reduced carbon footprint, zero noxious emissions.
The technical solution

The Fuel Reformer

The heart of the PowerPac is the patented and proprietary fuel reformer, which converts standard road diesel into hydrogen rich gas.

A mixture of diesel, air and steam creates a heat neutral reaction. All the conversion is done by a catalyst and therefore does not create any harmful by-products like a combustion engine does. The hydrogen is fed to the fuel cell anode.

Features:
- Zero emissions of NOx, SOx, NMHC and PM
- High fuel efficiency
- Stable operation
- Low pressure drop
- Patented design

The Fuel Cell

The Fuel Cell stack is developed to fit the hydrogen stream from the fuel reformer and produce power using fresh air with only water as by-product.

The patented technology gives an advantage for operations with reformed fuels. The Fuel Cell has a high efficiency, fast start up and a robust design.

Features:
- Fast start up power
- High power density
- Robust construction
- CO tolerant
- Low pressure drop
- Patented design

The PowerPac

The PowerPac electric generator consists of three modules:

- The fuel reformer module that converts standard low sulphur diesel to hydrogen rich gas.
- The fuel cell module that combines the hydrogen stream from the fuel reformer with air to produce power.
- The power electronics to deliver power to the user.

Features:
- Zero emissions of NOx, CO, SOx, NMHC and PM
- Low noise and vibration levels
- Low thermal signature
- High fuel efficiency
Data Sheet – PowerPac

<table>
<thead>
<tr>
<th>Generation</th>
<th>Stationary Product</th>
<th>Truck Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Power output (kW)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Voltage output (V)</td>
<td>24/48</td>
<td>24</td>
</tr>
<tr>
<td>Max Efficiency after DC/DC (%)</td>
<td>&gt; 30</td>
<td>&gt; 30</td>
</tr>
<tr>
<td>Dimensions (dm³)</td>
<td>≤ 325</td>
<td>&lt; 250</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>≤ 175</td>
<td>&lt; 150</td>
</tr>
<tr>
<td>Start-up time (min)</td>
<td>&lt; 30</td>
<td>&lt; 10</td>
</tr>
<tr>
<td>Minimum Operating life (h)</td>
<td>10 000</td>
<td>10 000</td>
</tr>
<tr>
<td>Start stop cycles (#)</td>
<td>Appl. Dep.</td>
<td>&gt; 1 000</td>
</tr>
<tr>
<td>Sound level (dBA)</td>
<td>&lt; 60</td>
<td>&lt; 60</td>
</tr>
<tr>
<td>Ambient air (°C)</td>
<td>-10 – 35°*</td>
<td>-25 – 45°*</td>
</tr>
<tr>
<td>Vibration (g all axis)</td>
<td>6</td>
<td>10</td>
</tr>
</tbody>
</table>

* For higher ambient temperatures active cooling will be used

About PowerCell

PowerCell is a leading energy technology company with a unique and patented technology for generating electricity from fuel cells in an efficient and environmentally friendly way. PowerCell develops and distributes advanced fuel cell systems for the transport industry, the telecommunication industry and the military sector.

PowerCell is a spinout from the Volvo Group with the objective to develop and produce environmentally friendly power systems based on a unique fuel cell and reformer technology that matches existing fuel infrastructures. PowerCell is based in Gothenburg and is owned by Volvo Group Venture Capital, Fouriertransform, Midroc New Technologies and OCAS Ventures. For further information, please visit: www.powercell.se.