Emissions-Free Solutions to the World’s Energy Challenges

The world’s first hydrogen-fueled EV recharger for commercial and industrial vehicles

Enabling charge points at any location – even with no grid connection or limited supply

Providing rapid charging with 24/7 availability and zero emissions

Hydrogen Power For A Better World
With a forecast 96,000 barrels of worldwide diesel consumption displaced per day by the Electric Vehicle (“EV”) and an estimated 6.4 million barrels projected by 2040 (Source: Bloomberg NEF), it can no longer be denied that the EV has evolved to become part of today’s mainstream automotive experience.

In the UK alone, with over 30 consumer models now available for purchase, EV sales have risen by 378% in 2019 and with further strengthening of policy and fiscal initiatives, this looks set to grow at an even faster rate in subsequent years. Worldwide, it is estimated that 100 million EVs will be on the road by 2025.

The Charging Conundrum

Growth in EV sales, coupled with an ever-increasing battery size to address range anxiety and “convenience” based rapid charging, are all placing a greater onus on our power network and supplies to meet the Charging Conundrum.

Earlier this year, the U.S. Smart Electric Power Alliance, representing 73% of the United States’ power generation, emphasised that utilities, fleet owners and car park operators needed to plan ahead to minimise grid impacts from an ever increasing number of megawatt-scale public, corridor, fleet and private charging sites. This investment must focus on the right sizing of EV charging infrastructures to avoid unnecessary project delays, cost and grid impacts.

In the UK, a recent (2019) study commissioned by Scottish Power confirmed that to meet EV deployment targets, almost £100bn of new investment would be required in network upgrades and EV charging stations – most of this investment would need to be spent over the next decade. This investment has been challenged by many as being at the lower end of expectations.

Although charging overnight at home is now relatively convenient for most EV owners, not everyone is fortunate enough to have access to off street parking. And as for fleet operators and commercial vehicles, who are accelerating their transition to EV pools, large scale rapid charging is often a corporate necessity which cannot be met without localised grid upgrades or system reconfiguration. And what about public or private car parking facilities? Many car parks, have no electrical infrastructure beyond a few lamp posts and pay and display machines and may in fact be a considerable distance from an electrical supply of sufficient size for multiple rapid EV charging stations.

And that’s all before we even get to the need for multi-megawatt scale rapid charging for municipal transporting networks.

This all presents something of a challenge to fleets, car park operators and EV cluster points, without an easy or obvious solution.
The Solution…
AFC Energy has developed a deployable, self-contained, zero emission charging solution which is able to overcome the issues of poor grid coverage and provide rapid charging. At its heart is the H-Power™ system which can be safely fuelled by a variety of hydrogen sources and is designed to work at optimum efficiency whilst storing electricity to enable high charge rates when required. H-Power EV ensures the sustainable electric car transportation model can continue to grow unhindered.

H-Power EV Charging
H-Power systems deliver zero emission power at point of use.

With modularity and scalability at the heart of its engineering, the H-Power system allows bespoke or standardised units to be easily configured and connected to generate the power you need, when you need it.

When containerised, most mechanical and electrical interconnections are housed within a standardised ISO container, with a simple and reduced cost of installation and transport for the end user.

The container is insulated and fitted with the required environmental controls to allow operation in a wide range of climates, without the odour or noise traditionally associated with diesel engines, making it ideal for sensitive and built up operating environments.

Fast and easy deployment, without the need for civil works and other capital expenditure, make the H-Power system a key part of any decarbonised off-grid power solution.

Hydrogen sourcing or auxiliary generation equipment is also available from third party suppliers through AFC Energy for integration into the final product solution.

When deployed alongside existing and complimentary technology (e.g. battery storage) the H-Power system will form part of a modern technology strategy enabling customers to map out a glide path to net-zero carbon emissions whilst containing the cost of power and growing EV charging capability with their customers’ needs.

AFC Energy can work with all EV charging operators to provide these units as part of an integrated emission free power system.

Modular H-Power systems are available in three standard configurations:

<table>
<thead>
<tr>
<th></th>
<th>H-Power (L20)</th>
<th>H-Power (L160)</th>
<th>H-Power (L400+)</th>
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</thead>
<tbody>
<tr>
<td>Charge Points</td>
<td>2 – 8*</td>
<td>15 – 30*</td>
<td>25 – 100*</td>
</tr>
<tr>
<td>Storage capacity (kWh)</td>
<td>72 - 288</td>
<td>288</td>
<td>360</td>
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<tr>
<td>Recharge rating (kW)</td>
<td>20</td>
<td>160</td>
<td>400+</td>
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<tr>
<td>Greenhouse emissions</td>
<td>Zero</td>
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<td></td>
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<tr>
<td>Noise and odour</td>
<td>Low</td>
<td></td>
<td></td>
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<tr>
<td>Fuel feedstock</td>
<td>Hydrogen or ammonia</td>
<td></td>
<td></td>
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<tr>
<td>Footprint</td>
<td>10’ ISO</td>
<td>40’ ISO</td>
<td>40’ ISO</td>
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<tr>
<td>Available from</td>
<td>Dec 2019</td>
<td>June 2020</td>
<td>June 2021</td>
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*range for number of charge points supported is a function of charge rate to vehicles and utilisation rate of charge points

Other bespoke sizing options are also available on request.
Modularised and Flexible Design for Diverse Applications

AFC Energy offers modularised and flexible design of the H-Power system suite of solutions to be deployed in such diverse en-route and destination applications as:

- Motorway service stations
- Multi-storey and open car parks
- Hotels, supermarkets and shopping malls
- Transport, commercial fleet, logistics hubs
- Construction sites
- Mines
- Marinas

In these markets, the ability to provide fast and rapid charging can have a direct impact on the bottom line due to avoiding lost revenue through vehicle down time or increasing revenues from customer attraction and retention. Identifying a zero emission, off-grid, rapid EV charger presents one key solution to the infrastructure and investment challenges necessary to facilitate the growth trajectories of EVs and deliver a decarbonised transportation network.

Through a combination of AFC Energy’s proprietary HydroX-Cell(L)™ fuel cell and battery storage or supplementary grid power, we offer a rapid charging, 24/7 available, zero emissions solution to the motorists and industry’s emerging need for a national network of charge-points.

Partnership

AFC Energy is actively looking for partnerships to participate in the early roll out stages of this new, exciting and necessary technology.

The advantages of early participation are:

- A hands-on understanding of how the EV charging environment is changing
- A participation in the preparations for the inevitable EV wave
- An opportunity to provide EV charging where it has not been possible before

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Adam Bond, CEO of AFC Energy, with the H-Power EV Charger.