DELTA
Energy & Environment

Delta Research Brief

Electric Vehicle Infrastructure Manufacturers – a Wide but Shallow Choice for Utilities

THE NEED FOR EARLY INVESTMENT IN CHARGING INFRASTRUCTURE

The electrification of Europe's road transport now sits high on the policy agenda of most countries, with new and increasingly ambitious targets being set by governments across the continent. The race is on to kick-start the electric vehicle (EV) market in order that these targets can be achieved.

A critical enabler of this market growth will be the effective roll out of a network of *high cost charging infrastructure*, the investment for which must come from a range of stakeholders: in particular utilities, governments and municipal / local authorities.

DELTA'S RESEARCH: WHAT IS THE QUALITY OF THE CHOICE AMONG INFRASTRUCTURE PRODUCTS?

Choosing the right infrastructure is vital while an EV market does not yet exist. Delta has therefore researched and interviewed a range of infrastructure manufacturers in Europe and the US[1] in order to understand the choice available to charging network investors, including utilities.

This has given us a clear view as to the quality of the choice that utilities now have, and the degree to which the available products (Figures 1, 3 and 4 are illustrative examples) fit with their emerging needs and strategies for electric vehicle deployment.

This Delta Research Brief provides a high level summary of our findings.

FIGURE 1. Elektromotive's **Elektrobay**

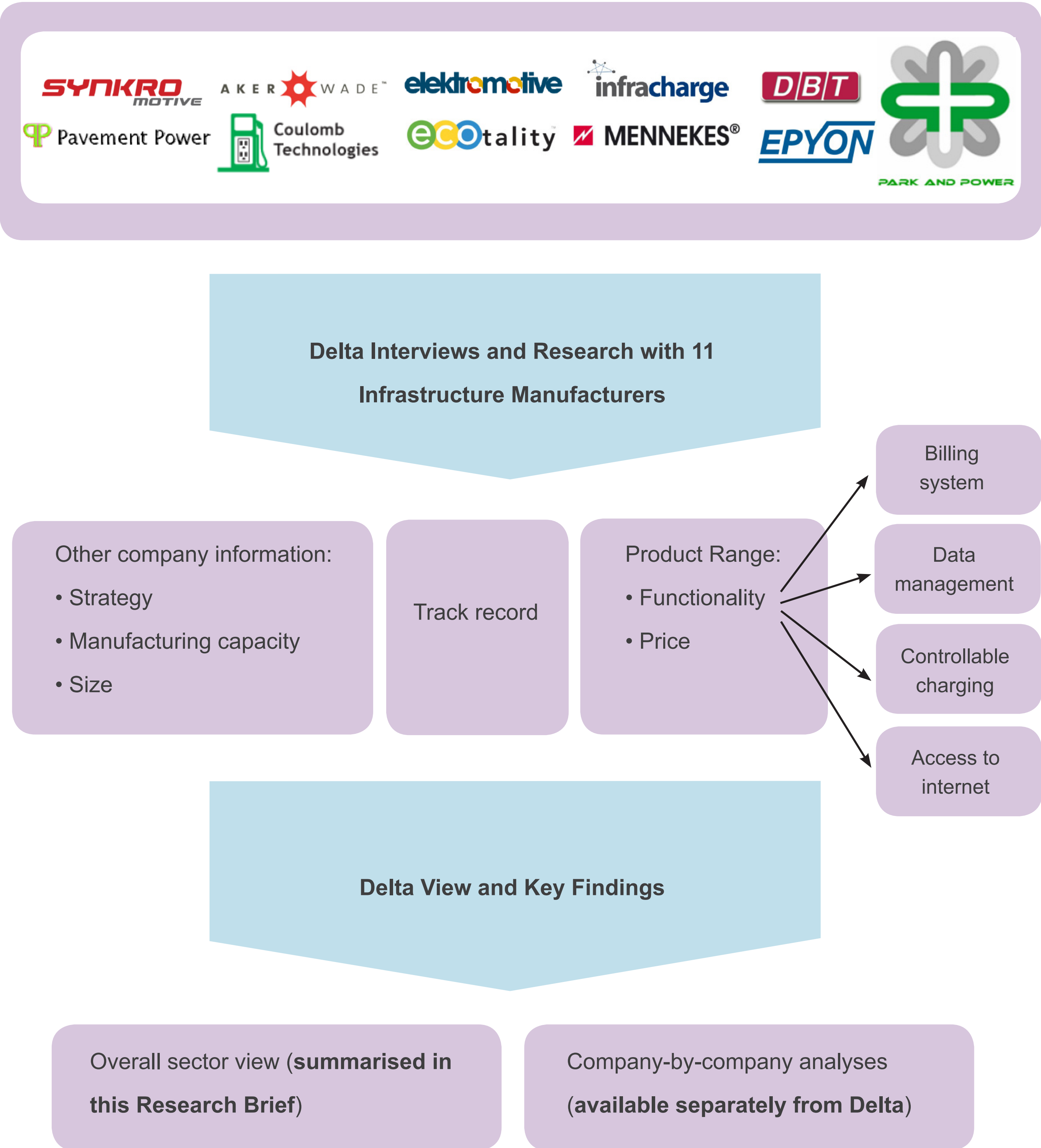
Source: Elektromotive, 2009

[1] Delta has also looked at two companies with quite different business models to the others, BetterPlace and Evoasis.

Our Approach - In Summary

Delta's approach to our research is summarised in Figure 2 below.

FIGURE 2. Delta's research approach



Logos: Courtesy of company websites

We Have Researched 11 Infrastructure Manufacturers

The companies we have studied are:

- **Aker Wade, USA**
- **Coulomb Technologies, USA**
- **DBT, France**
- **ECOtality, USA**
- **Elektromotive, UK**
- **Synkromotive, USA**
- **Epyon, Netherlands**
- **Infracharge, UK**
- **Mennekes, Germany**
- **Park & Power, UK**
- **Pavement Power, UK**

Three Core Areas of Comparison Between Companies

We identified 3 areas of focus for our research to enable meaningful comparison to be made between manufacturers:

1. EV infrastructure product range, including
   a. Details of product functionality (see also the section below)
   b. Product price ranges
2. Company track record, based for example on sales to-date and any utility joint-ventures
3. Company information: for example size, manufacturing capability and strategy

Finally, for each, we have arrived at an overall ‘Delta View’ of the company offerings and how we think they are positioned to meet utility needs.

Product Functionality - What We Have Looked At

The functionality of charging points is a key consideration for electric utilities as they seek to identify how they can most effectively benefit from the market growth of EVs. Several functionalities are available and in order to compare those offered by each product, we have selected four categories as a central part of our research. They are summarised in Table 1 overleaf.

TABLE 1. Description and importance of the key infrastructure functionalities.

Functionality	Description	Importance
Billing system	A system that allows the infrastructure owner to bill consumers for use of a charging point and for the electricity consumed.	Enables infrastructure owners to potentially make a return on their investment. Billing approaches available include, for example, annual subscriptions and payment for kWh at the charging point via credit card.
Data management	Data such as the length of time plugged in, the identity of the customer, the state of charge of the battery and the time of day is gathered and stored at the charging point. This is then sent in packets to the operator. The nature of the data gathered, and how it is processed in the posts, varies between manufacturers.	The data captured when EVs charge can be of value to many stakeholders. For example: • Infrastructure manufacturers, local authorities and utilities will want to know when, where and how users charge. • Battery manufacturers want to assess their product's performance under different charging patterns.
Controllable charging	The electricity being supplied from a charging point can be turned on and off remotely by the operator, or can be programmed to do so by the user in response to electricity prices signals[2].	This is of most interest for DNOs that wish to discourage or prevent charging during peak hours, while encouraging it at other times (eg during low demand / high wind conditions) - but is also relevant to cost conscious consumers.
Access to internet	The internet can be accessed from the vehicle, enabling such additional services as music downloads and software upgrades (e.g. Sat Nav updates) while charging.	Where charging duration is an inconvenience, this can provide customers with compensating benefits. And additional services can offer new revenue streams, offsetting investment costs.

Source: Delta Energy & Environment Ltd

[2] Note: Charging stations can also provide a 'slow' low level charge, necessary to prevent damage to the battery. Normal charging typically only occurs between 20 and 80% state of charge, otherwise the battery can be damaged. These stations allow control over the power level of charging as well as simply turning them on and off.

Our Two Key Findings Are:

1. The market is characterised by a high proportion of younger, smaller, new entrant manufacturers ...

We have found that not many of the companies offering charging points tend to have a strong track record of proven products and / or sizeable manufacturing capacity. In other words, relatively few infrastructure providers are offering products that have already been tried and tested in the field and are capable of delivering high volume orders in the short-term.

"...relatively few infrastructure providers are offering products that have already been tried and tested in the field"

This may make it more difficult for utilities to identify suitable partners or suppliers from those manufacturers new to the market or currently entering it. For the moment, therefore, there is not a sufficiently wide choice of manufacturers to give utilities full comfort in their effort to roll out infrastructure pilot projects in the short-term.

2. ... while the manufacturers as a whole are collectively offering products with a diverse range of functionality and capability

A spectrum of products is on offer. Some products only have small differences in their functionality, while others differ greatly in their level of intelligence (and cost). The benefit of this is that there is a wide range of products with various functionalities to choose from, offering at-home, off-street, on-street and fast charging solutions.

"there is a wide range of products with various functionalities to choose from"

So whether a supermarket wants to use simple and cheap points offering a free charge to attract customers, a fleet operator wants fast charging to maximise vehicle productivity, or a utility wants to control charging or implement time of use tariffs - a solution appears to be available.

FIGURE 3. EPYON charger

Source: EPYON, 2009

THE FUTURE EVOLUTION OF PRODUCT FUNCTIONALITY WILL DEPEND IN LARGE PART ON EV CHARGING BUSINESS MODELS – AND THESE REMAIN FAR FROM CLEAR

Securing a return on the investment in installing charging infrastructure is still a key challenge. While simple billing systems may allow the electricity to be paid for, it is less clear what the options for recovering all the infrastructure costs are.

We see an opportunity here – indeed a challenge – for utilities to step in and develop the innovative business models that will in turn influence the development of infrastructure products.

For example, will some utilities take a view that a high share of on-street charging is not the way to go forward and instead focus on off-street opportunities? If so, this may well require different charging points with different functionality.

"While simple billing systems may allow the electricity to be paid for, it is less clear what the options for recovering all the infrastructure costs are."

For now, the diverse array of products available means that different approaches can be trialled before any large-scale commitment to a particular pathway is made.

FIGURE 4. Coulomb Technologies' ChargePoint

Source: Coulomb Technologies, 2009

For more information …

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