**iBUILD Workshop 12th November 2014**

**Hilton Treetops Hotel, Leeds.**

Making the business case for public charging infrastructure

**Speakers**

* Josey Wardle – Infrastructure Manager, Zero Carbon Futures (UK) Limited & PhD student at the University of Newcastle
* Alexandra Prescott – Operations Director, Charge Your Car Limited
* Adrian Vinsome – CENEX
* Neil Ellison – former Sustainability Manager, Stockton-on-Tees Council
* Jeff Hardy – Senior Manager, Sustainable Development, Ofgem
* Derek McCreadie – Low Emission Officer, City of York
* Brian Orr – Managing Director, EV Matters
* Yvonne Huebner (CHAIRPERSON) – Senior Researcher, Transport Research Operations Group (TORG) at the University of Newcastle

**Aim**

To discuss options for a sustainable business model for public electric vehicle recharging infrastructure.

**Summary of the discussion**

The panel stressed that EV recharging is still a nascent market which is required to break down the barriers to low carbon transport in order to respond to climate change concerns. However, this requires major societal change. There are many different stakeholders in this market, with differing desires and objectives, leading to a multitude of potential benefits to be considered in any business model, many of which are difficult to define. The costs are more clearly understood though, particularly with respect to the role of the Network Operator. Dwell time and location are two key components of the recharging business model which affect demand from EV drivers. Business models must also allow for as yet undefined future changes in recharging technology, EV technology, EV use and customer profile, which will result from increasing uptake of EVs. The EV drivers’ reasons for adoption may have been misjudged to date, low running costs are a fundamental component of this decision and therefore fees for recharging are a very important factor. The psychology behind the operation of fees should be considered in more detail. EV drivers should be consulted with specifically in the creation of future business models. The role of OLEV subsidies was recognized, for example in the early Plugged in Places (PIP) projects, however there was also some criticism of a lack of joined-up long-term thinking and involvement of EV drivers in their policy setting to date. The role of EU government should also be better understood.

**Background**

Josey Wardle gave a brief presentation explaining her PhD topic and research questions, which is providing one case-study for iBUILD. This included a brief history of the creation of the North East of England’s EV recharging infrastructure through the region’s Plugged in Places project (NE PIP) and the status of analysis and business case development so far.

The early provision of EV recharging infrastructure has been heavily subsidized by UK government, local authorities and private companies as part of sustainable transport and emission reduction plans. However, as public subsidies decline, the recharging infrastructure will begin a move to operation on a more commercial basis.  The introduction of fees for EV recharging is likely to affect the behaviour of EV drivers in terms of their recharging habits (time, location, duration etc.), willingness to pay, journey characteristics and potentially their overall EV usage. These behavioural changes will, in turn, affect the owners of recharging equipment and the businesses operating this equipment in recharging networks. Coupling these events with uncertainties about changes in vehicle and recharging technology and likely EV uptake generate many uncertainties and unknowns around the creation of a sustainable business model for the provision of a public EV recharging infrastructure in the UK.

2 questions were then put to the panel of speakers for debate;

* How can we make a business case for public EV recharging infrastructure stack-up?
* What costs and benefits should we take into account when making a business case for public EV recharging infrastructure?

**Alexandra Prescott – Charge Your Car Limited,** a national Network Operator of EV charge points, which originated in North East England in 2012.

Alexandra compared the early state of the EV recharging market to that of mobile phones and mentioned the UK government’s recent discussion about strengthening the broadband networks across the UK as a comparison.

The role of a Network Operator is to provide recharging services which meet the needs of EV Drivers, with the ultimate goal of enabling them to recharge their Electric Vehicle (EV) as freely as a driver of an Internal Combustion Engine (ICE) vehicle. The Network Operator provides charge point services to EV drivers on behalf of charge point owners. However, the Network Operator must make some profit in order to stay in business, and invest in future developments to further satisfy EV driver’s demands.

The market should decide what costs and benefits should be taken into account. The EV driver has a social conscience but is also price sensitive. The charge point owners think about the economic benefits of charge point provision as well as value-adding benefits.

But there is no such things as “a free lunch”. There are costs associated with providing any benefit.

**Adrian Vinsome – CENEX,** manager of the Midlands Plugged in Places project called Plugged in Midlands.

Adrian stressed that public recharging infrastructure IS required both to create a strategic network to encourage the uptake of EVs, especially whilst EV range is still relatively low. There are 2 key components of public recharging infrastructure; the dwell-time and transit locations. At important transit locations EV drivers are willing to pay more to get a quick charge and continue with additional range in their journey. Dwell-time benefit is more intangible however, a customer has been brought to your site but it is more difficult to value that benefit.

This is a nascent market which we expect to change over time. It is necessary to kick-start this market which will lead to increased EV sales volumes at which point new challenges will be seen and new technologies will be required, but costs will come down too.

Adrian supported the UK Office for Low Emissions Vehicles’ (OLEV) grant programs for EVs and recharging infrastructure, but stressed that continuing subsidy support will be required to continue operation of the early recharging networks created. To make it work in the long term we need to get over the purely economic aspects of the early market. For example, there is currently no financial penalty for the continuing operation of ICE vehicles, and maybe taxes could be levied in future for the health, social and environmental consequences of consumer’s transport choices.

**Neil Ellison –** former Sustainability Manager at Stockton on Tees Borough Council.

There are many different versions of public recharging infrastructure, and so many different market streams and therefore many different business models will be required.

EVs are still evolving so this will change the needs for recharging in public in the future.

Undoubtedly, the volume of EV sales will increase over time. The customer profiles are likely to change over time, early adopters have different attitudes to those volume customers who will come later in the market’s lifecycle.

The need to decarbonize our environment is key to Local Authority objectives but commercial charge point owners such as the Metro Centre are focused on bringing customers to their facilities. So the relevant costs and benefits depend upon WHO you are, and your objectives, and these will also change over time. So any business model needs to be able to respond to changing market information.

**Jeff Hardy – Ofgem,** Senior Manager, Sustainable Development, Ofgem.

Jeff is involved in knowledge exchange programs such as that being undertaken between Newcastle University, Ofgem and OLEV currently, sharing the experience gained in the North East for the benefit of cross-departmental policy-making in the future.

It is not Ofgem’s job to do anything about the business case for EV recharging infrastructure, but they are interested in the costs and benefits associated with it. Ofgem has a duty to protect the interests of energy users in the population, so if there is a need to shift the population’s actions they need to know about it. This includes the management of regulatory barriers, which have already been used to the benefit of the early EV recharging market.

Ofgem’s most important interest in EV adoption is the impact upon the electricity distribution network. Part of connection costs are already socialized.

Ofgem is keen to encourage a full systems approach to EV recharging, considering and accounting for all the aspects affected by it. Ofgem is also keen to encourage flexibility in when and where people charge, ideally encouraging charging where capacity is available and not where constraints already exist.

**Derek McCreadie,** Low Emission Officer, City of York.

For public bodies such as a Council, it is really important to break down the barriers to low carbon vehicle transport.

There will be different business cases for all the different varieties of infrastructure and use cases. The benefits will vary depending upon the charge point hos (i.e. Charge point owner) and their purpose.

The costs are easier to define than the benefits, and are pretty similar for each kind of charge point host – the electricity supplied, network operation costs, maintenance etc. Local Authorities can’t make much money out of charge point provision, York pays typically 10p/kWh for the energy supplied. The convenience to the EV driver as customer is a key factor so their voice must be listened to, for example in relation to the location, mechanisms and access methods for charge points.

A key part of the business case for buying an EV is the use of recharging infrastructure, so if we start tinkering with that provision in a negative way, it could vastly reduce EV sales. The scale of fees charged is therefore very important now and in the future.

“Green shoots” really ARE important in enabling changes in behaviour, particularly in relation to climate change requirements.

The psychology of fee payment is very important to this field – it is much more acceptable to a customer to start with a low fee for something and then increase it over time, than it is to start receiving something for free and then to have to pay for it in the future, regardless of how low that fee may be.

**Brian Orr – EV Matters,** Brian Orr – Managing Director, EV Matters.8

We are trying to move society forward into a cleaner environment, so the successful ways in which we can achieve societal change are key here.

“Blue sky thinking” is necessary to achieve such radical change, and defining the benefits which add value to people’s lives at a reasonable cost will be important to encourage changes in behaviour.

Brian would like to see mathematical models created which are not region specific but could be applied across the UK and Europe. Business models should include the needs from multiple viewpoints. User acceptance tests covering performance levels, reliability standards and quality of service requirements are also key to development of any new market and Brian believes this has been sadly lacking in the early development of the UK’s recharging infrastructure. A service of an acceptable quality at an acceptable cost is required. And it must be able to evolve over time too. Therefore, the use of what-if scenarios in any mathematical model would be beneficial. These could be used to try-out different ownership models, which would in turn enable people to make free choices about purchase.

There are a number of artefacts involved in this model; the subsidized role out of regional estates of infrastructure set-up to date, the location of charge points, their capability – are they fit for purpose?, technologies – are they capable of supporting not just motive power in the future?

**Group discussion and questions from the floor**

Alexandra commented that CYC has costs which have to be absorbed and therefore they must charge for their services but they must also satisfy their customers with the services provided. These services can and will expand, indeed additional services are already in development in response to customers’ requests, both EV drivers and charge point owners. But there is a balance to be struck between satisfying customers and the associated prices that can be charged. Network Operators are self-regulated because if customers aren’t willing to pay the fees being charged then they won’t use the service.

**Question – Who is using EVs, what are their demographics? Don’t EVs need to appeal to the majority of the population to make it the future, so how do we build confidence and increase adoption?**

Neil replied that in his opinion most people will use EVs in the future however there are still some barriers to be overcome. Many potential users cannot charge at home, so other charging solutions are required for them. Regional GVA is also important for Local Authorities e.g. encouraging EV and infrastructure supply chain activities in the NE. Neil also mentioned a recent BMW statement that they would phase out ICE vehicles in favour of electric drive train technology in the future.

Brian responded that it is possible to do most journeys by EV now, with the introduction of rapid chargers at service stations for example

Derek commented that only 1 in 4 people actually buy a new vehicle, referencing a DfT survey showing that most people will not pay more than £5k for a car. The SMMT’s average price for a new ICE car is actually greater than a new EV (£29K versus £20K).

Jeff added that we need to define the wider benefits of EVs, and understand how the various players can be given beneficial room to grow without regulatory barriers, whilst at the same not distorting the market in the future. It doesn’t make sense to run a low carbon system in the same way as the current system.

**Question – there a screaming void for energy storage solutions to support the electricity distribution system. Is there an economic case to make the integration of renewable energy generation work in this context too?**

Adrian replied that storage may help in home and workplaces, but not in public locations.

Jeff added that what is really needed is flexibility across all forms of generation and use.

Alexandra added that she does not believe customers are adopting EVs for the reasons academics presume. They are actually buying them fundamentally because they are cheaper to run than ICE vehicles.

Brian then added that robust research is therefore required into the social reasons for EV purchase and this should then inform future policy and business models.

Derek commented that understanding EV drivers in different use groups will help business modelling. For example, consider their previous models of transport, mileage etc too.

**Question – The role of UK government needs to be put into context too, and an effective and efficient rationale developed to encourage future EV adoption in the UK.**

Adrian cautioned that EV manufacturers are global organizations and the UK market does not make a particularly high contribution to their global volumes. So any UK government lobbying will have limited effect.

**Question – surely there is a need to set standards at government level, which will then feed into EV manufacturers products.**

Adrian responded that one of the aims of the regional Plugged in Places projects was to start doing this, and the setting of the IET standards for type 2 connectors was an example of this. However he also cautioned that technology actually moves on faster than regulations, so the risk of regulations quickly becoming out of date and inappropriate is quite high in such a nascent market.

Brian added that the role of European government has been poorly understood in this market. Our experience is that UK government actions change in the run-up to elections and so long term strategies are difficult to maintain. The UK government’s actions now need re-energising.

Also BMW contribute very low volumes to UK EV sales currently.

We need to have a range of long term, active partners if the UK is to deliver the required change in social behavior to respond to climate change.

Derek supported this view, stating that there is a strong role for government to play at both local and national level, especially whilst we are still in the very early stages of this market. OLEV’s early incentives were important but there is no exit strategy associated with them, and it is too early for OLEV to back-out of this market just yet.

**Question – have we spoilt early EV drivers?**

Adrian answered No, this is the nature of early development, change is required and encouragement is required to make such major changes.

Alexandra suggested that a different type of messaging from the start would have helped the change to take place from free to fee based recharging – explain clearly that free offers are time limited.

Derek stressed the difference between free and low-cost solutions, and the comparative ease of making an increase in fees versus starting to charge a fee for something that was previously free.

Neil added that we should stop worrying about what current EV drivers think, they buy them because they want them. We need to concentrate on what the new categories of EV drivers entering the market will want, their needs will be different to those of early adopters.

Brian commented that there was a lack of joined up national thinking in OLEV’s Plugged in Places roll-out of recharging infrastructure, and this needs to be redressed for the future. He also berated the lack of EV drivers in OLEV’s original stakeholder map.

Adrian responded to Brian’s comment, reminding us that the 8 Plugged in Places projects were always intended to be regional experiments, to research the factors involved in recharging infrastructure roll-out and use. Such research is always necessary in major change initiatives.