



Quick Chargers in the North East: From a vision to reality

Dr Steve McDonald

CTO Emerging Technologies

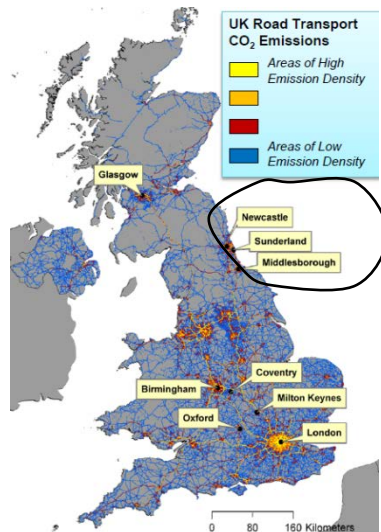
Overview

- The Charge your Car project
- Procuring Quick Chargers
- Installation and commissioning
- Operation
- Integrating with Back office
- Future development



What is Plugged In Places (PIP) ?

- Programme Nationally funded by the Office for Low Emission Vehicles (OLEV)
- NE PIP project = £7.8m over 3 years to March 2013, funded by ONE, OLEV, public & private partners
- Over 60 partners – all 12 Local Authorities, private businesses, transport providers, academia, NHS, retailers, business park operators, fleet operators, home builders etc
- 1 of 3 projects in PIP Phase 1 – With London and Milton Keynes



• OUR AIMS

- To create a comprehensive connected network of electric charging infrastructure, across the NE region, within the next 3 years :
 - ❖ Install 1000 charging points
 - Public & private access, workplace, domestic & Quick charging points
 - With interoperability, comms capability & EV user support
- Work with OLEV and other UK PIP projects to :
 - Advance the development of common standards,
 - evaluate different technologies,
 - harmonise local incentives,
 - understand user-behaviours & impact upon infrastructure

Progress.....

- **Operational NE Charging Points – Mid Jan 2012**

- **Standard chargers (3/7 kW) 280 Installed**

- County Durham coverage increasing
- Call to Action req'd for Northumberland

- **Quick Chargers (50 kW DC&22 kW AC) 8 Installed**

- Metrocentre, Haggerston Castle, Dalton Park, Test Track
- Hexham, Alnwick, Gateshead Stadium, Washington
- Coming Jan-March 2012 – Wynyard, A66W(Morritt)
- Progressing – A1/A167, A1/A690, A66E

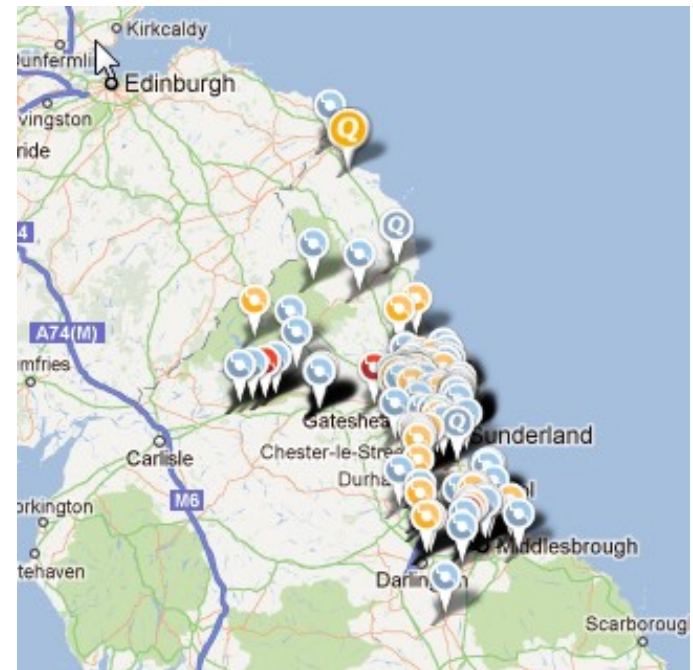
- **Domestic Chargers (phase 1) 67 Installed**

- **Domestic Chargers (phase 2) Started**

- **Back Office + EV User membership “Charge Your Car”**

- 65 Users & Useful Feedback starting to come in

- Total energy supplied = 17,640 kW



Charge Your Car (North) Ltd

- CYC (North) Ltd is a wholly owned subsidiary of Gateshead College.
 - UK Government closed the RDAs and a new home was needed for the PIP project.
 - GC has an ongoing strategy to develop its remit in Low carbon vehicles, so good fit.
 - New SASMI facility based next to Nissan plant houses Zero Carbon Futures and CYC(North)Ltd



Starting out

- We had no experience of Quick chargers
- No CE compliant units available
- John Lowes engaged to manage the UK introduction of QC's
- One of the first UK QC installed at Nissan Test track April 2010 in advance of first LEAF arrivals.
- First publically available QC in the UK at the Metrocentre Feb 2011



CHAdemo

We under estimated the task...

Offering Schedules TRO's DNO's Funding Agreements Planning Permission Guidance

Procurement documentation Governance Legal Agreements MOU's

EV Quick Charging

- **Performance Information**
 - 80% Charge (circa 80 miles) in 25 mins for Nissan LEAF
 - Requires a 3 phase 100A 415V supply (commercial infrastructure) + civils
 - 50kW DC output
 - Standard connector & vehicle communication protocol



Learning issues

- Installation process needed for publically accessible units
- Original Yazaki Plug a bit fiddly to use
- Some communication gremlins with vehicles initially.
- TEPCo unit needed to be “adapted” for EU market or alternative CE compliant units required. Some difficulty in finding a suitable partner.
- Lack of clarity as to likely EU direction for Q C. (23kW AC, 50kW DC CHAdeMO or not.....)

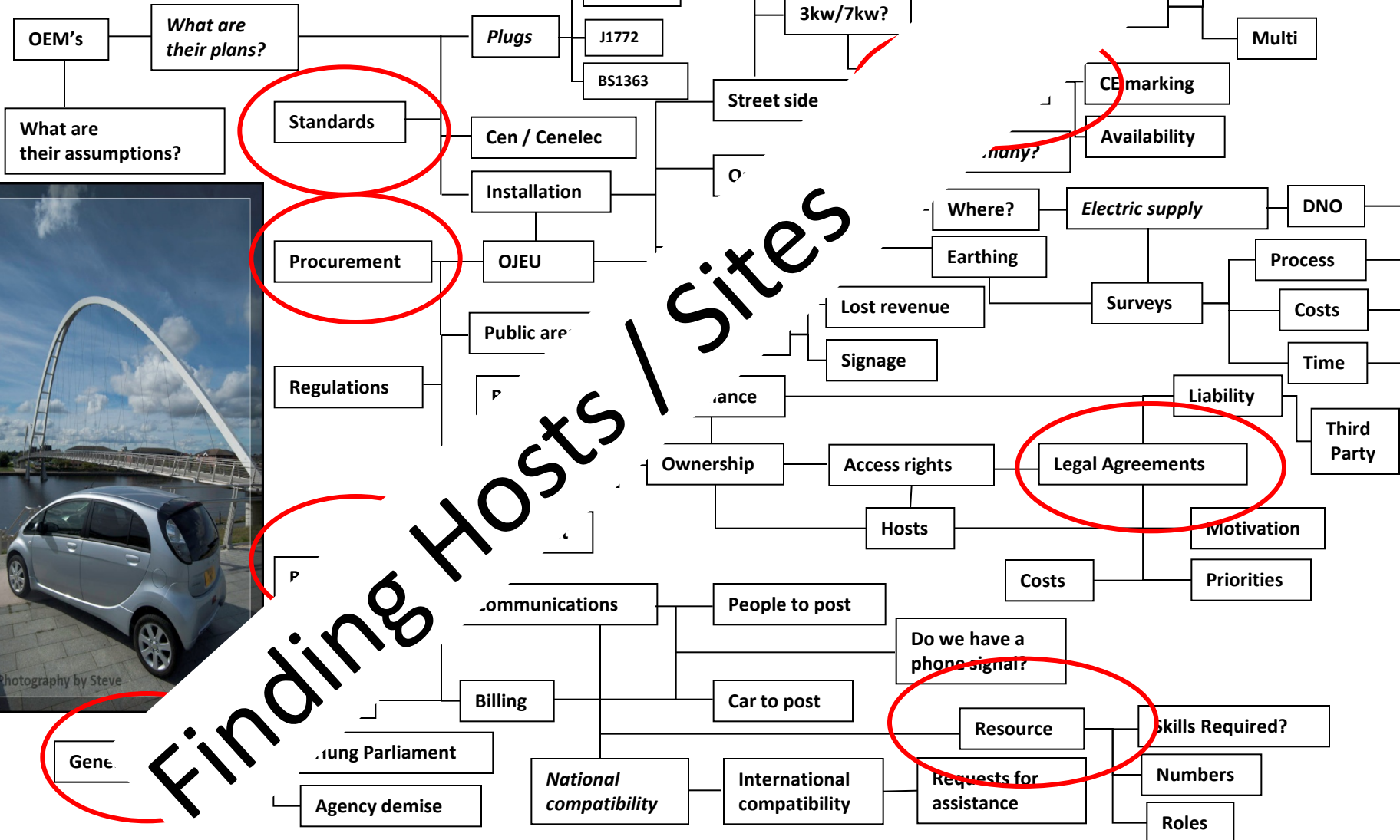


Procurement

- Three separate procurement streams:
 - Hardware framework
 - 50kW CHAdeMO compliant QC
 - 23kW three-phase Type 2 built in
 - CE compliant equipment only
 - Ability to integrate into our back office
 - Installation framework
 - Contractor required to install units in as yet undefined locations around the north East
 - Project management services
 - Consultant required to manage the installations “on the ground”



Challenges..



Finding Hosts / Sites

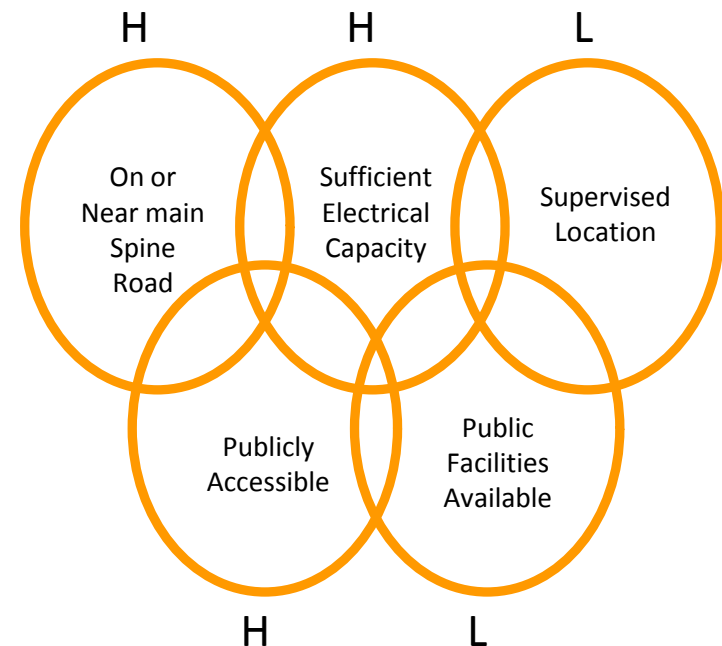
- OLEV
- SMMT
- JAMA
- CHAdEMO
- IET
- CENEX
- TSB
- ETI

Procurement - challenges

- Manufacturers were not “honest” about the state of readiness of their equipment.
 - Public procurement process is weak in filtering out rogue suppliers. We can only judge the responses by the content of the bid.
 - One who was, failed the procurement
 - Two who weren't passed the procurement, but failed to deliver! This caused us major problems and stress.
 - Original intention was to “trial” equipment from multiple manufacturers, as a result of the above, we ended up with only one supplier of equipment
- Very limited range of suppliers (Oct 2010)
- Resource demands to carry out the procurement
- Overall duration of the procurement exercise.
- All of our units are SGTE units, adapted by Elektromotive for our use

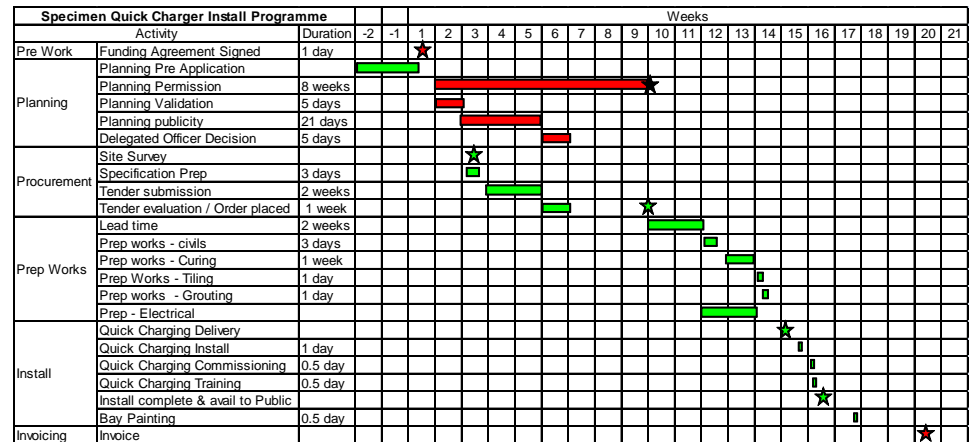
Installation (finding hosts)

- What criteria should we use to select hosts?
- What is our offer?
 - Initially we tried to ask hosts to contribute to cost of QC , but had to change to fully funded model
- Has still been a major challenge for us to secure suitable hosts

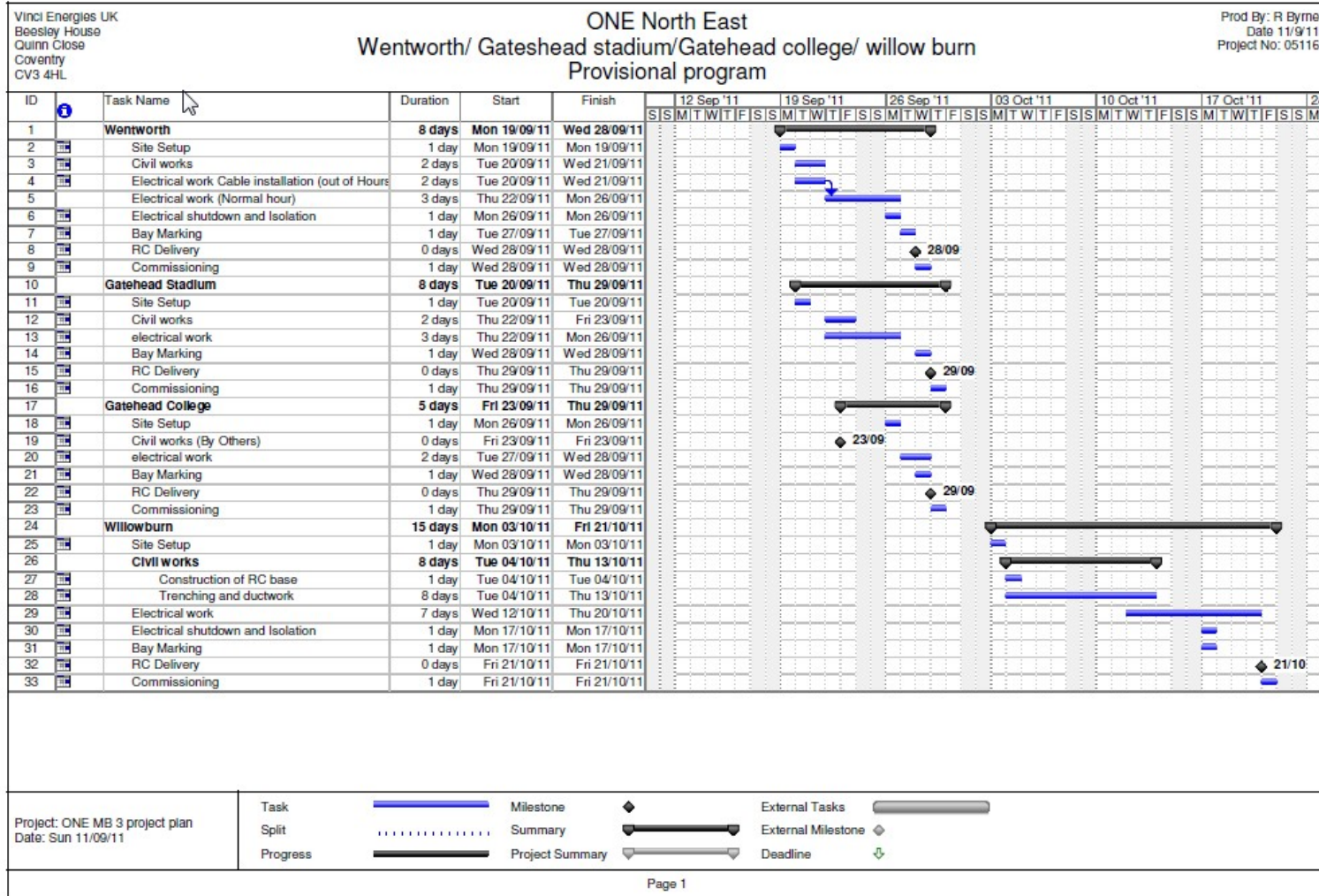


Installation (Process)

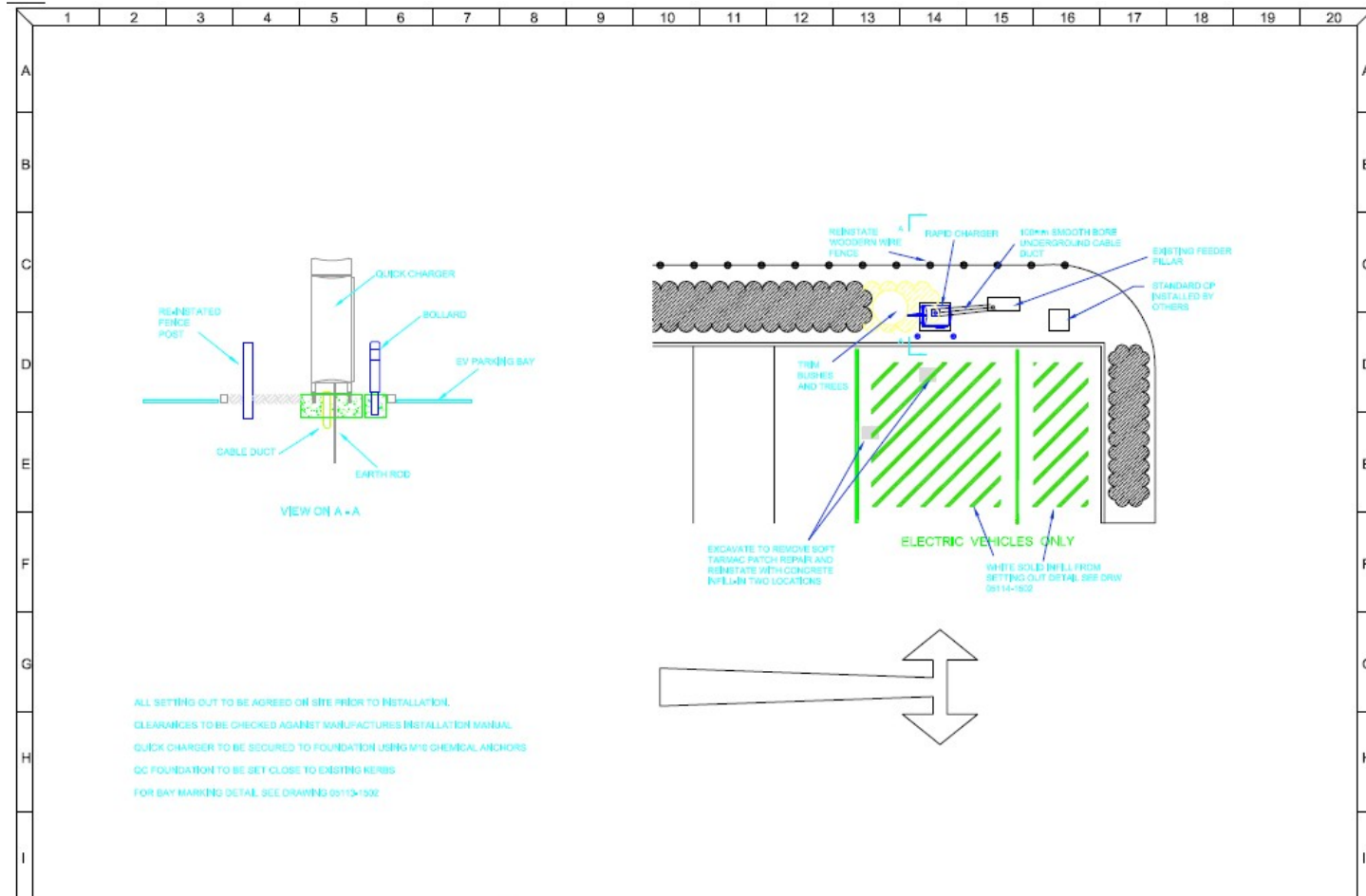
- Timeline is largely constrained by things we have little control over:
 - Awaiting signature of host agreement (>2 weeks)
 - Confirmation that the electrical supply can be installed (varies)
 - Planning (8 weeks)



Example Installation - planning



Example installation - design



ALL SETTING OUT TO BE AGREED ON SITE PRIOR TO INSTALLATION.
 CLEARANCES TO BE CHECKED AGAINST MANUFACTURER'S INSTALLATION MANUAL.
 QUICK CHARGER TO BE SECURED TO FOUNDATION USING M16 CHEMICAL ANCHORS.
 DC FOUNDATION TO BE SET CLOSE TO EXISTING KERBS.
 FOR BAY MARKING DETAIL SEE DRAWING 05113-1502.

ISSUE	REVISION	APPD.	DATE
1			
2			
3			



VINCI ENERGIES UK
 BEESLEY HOUSE
 QUINN CLOSE
 COVENTRY
 CV34LH

TITLE:
 RAPID CHARGER INSTALLATION
 GENERAL ARRANGEMENT
 GATESHEAD INTERNATIONAL STADIUM
 PLAN ON PARKING BAYS

CLIENT:
 ONE NORTH EAST

 LOCATION:

DRAWN
 RPO

 APPR.
 RJB

CHECKED
 NTS@A3

 DRAWING NO.
 05114-1501

SCALE
 DATE
 06/09/2011

 SHEET
 1 OF 1

Installation example - completed



Other Installation examples

- Installation includes:
 - Raised concrete plinth for QC
 - Protective bollards to prevent vehicle damage
 - Clearly marked out bay
 - Signage on QC
 - Cabling, earthing etc
 - RFID access point
 - Local Isolation



Operation (Learning issues)

- Accessibility:
 - Height of screen and weight of plug/cable is a problem for disabled access
- User friendliness:
 - Touch screen very hard to see in sunlight
 - Interface with RFID is “clunky”
- Yazaki plug is easily damaged – maintenance turnaround time too slow and expensive



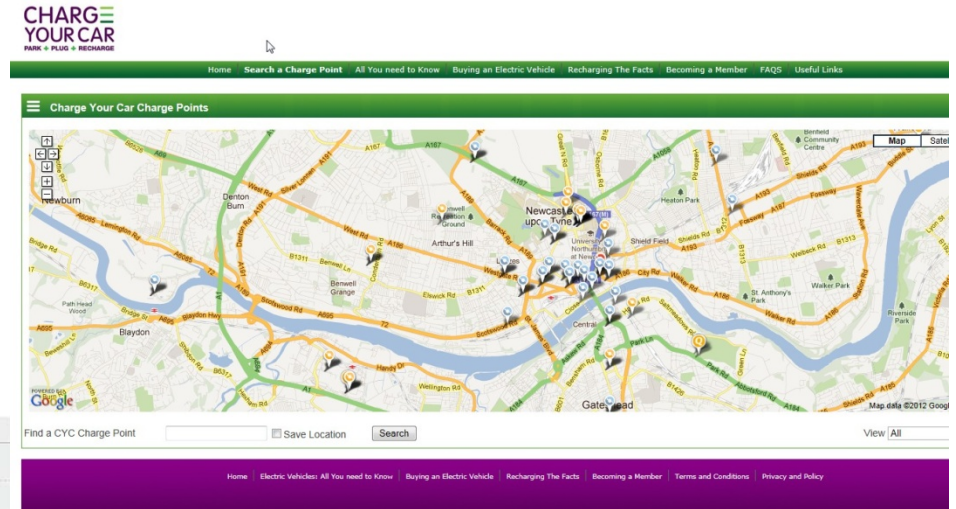
Pin breaks off if
plug is
mishandled

Operation (Educating our users)

CHARGE 
YOUR CAR
PARK + PLUG + RECHARGE

Operation (CYC – Back office)

<http://www.chargeyourcar.org.uk>



Site	Start Date	Duration		
Metrocentre Green Car Park [20064]	2012-02-15 11:30:32	0 Hrs 40 Mins		
Metrocentre Green Car Park [20064]	2012-02-14 19:22:18	0 Hrs 40 Mins		
Metrocentre Green Car Park [20064]	2012-02-14 12:58:57	0 Hrs 17 Mins	0 Hrs 17 Mins	4.600 kWh
Metrocentre Green Car Park [20064]	2012-02-14 07:38:57	0 Hrs 25 Mins	0 Hrs 25 Mins	5.500 kWh
Metrocentre Green Car Park [20064]	2012-02-13 08:50:05	0 Hrs 40 Mins	0 Hrs 40 Mins	11.920 kWh
Metrocentre Green Car Park [20064]	2012-02-12 19:48:47	0 Hrs 7 Mins	0 Hrs 7 Mins	3.610 kWh
Metrocentre Green Car Park [20064]	2012-02-10 17:31:34	0 Hrs 40 Mins	0 Hrs 40 Mins	16.610 kWh
Metrocentre Green Car Park [20064]	2012-02-10 15:41:53	0 Hrs 16 Mins	0 Hrs 16 Mins	8.110 kWh
Metrocentre Green Car Park [20064]	2012-02-10 11:36:02	0 Hrs 40 Mins	0 Hrs 40 Mins	11.090 kWh
Metrocentre Green Car Park [20064]	2012-02-10 11:35:55	55 Hrs 12 Mins	55 Hrs 12 Mins	2.971.270 kWh
Metrocentre Green Car Park [20064]	2012-02-10 11:35:14	0 Hrs 0 Mins	0 Hrs 0 Mins	0.010 kWh
Metrocentre Green Car Park [20064]	2012-02-09 19:07:42	0 Hrs 0 Mins	0 Hrs 0 Mins	0.010 kWh
Metrocentre Green Car Park [20064]	2012-02-09 19:07:36	0 Hrs 40 Mins	0 Hrs 40 Mins	8.860 kWh
Metrocentre Green Car Park [20064]	2012-02-09 18:25:30	0 Hrs 40 Mins	0 Hrs 40 Mins	12.250 kWh
Metrocentre Green Car Park [20064]	2012-02-09 14:47:01	0 Hrs 40 Mins	0 Hrs 40 Mins	15.020 kWh
Metrocentre Green Car Park [20064]	2012-02-09 14:46:02	0 Hrs 0 Mins	0 Hrs 0 Mins	0.010 kWh

- Operational since Oct 2010
- PAYG trial implemented Jan 2011
- Next generation under procurement

Operation (Usage)

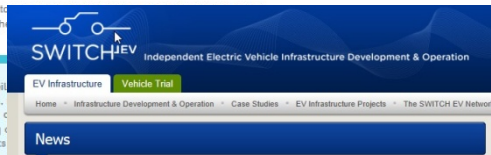
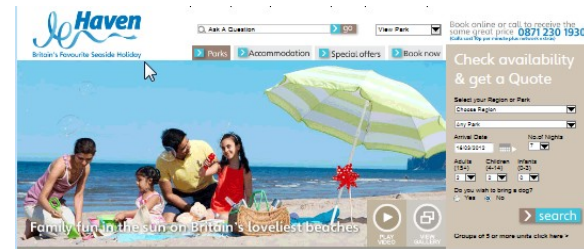
Example - QC energy usage at Metrocentre



Approx 100 vehicles in region
– approx 25 charges/month

Operation (Communications)

- Raising profile is key
- Ensuring users and hosts are both kept informed of developments
 - E.g initially, no CYC cards were required.
 - Introducing PAYG
- User etiquette
 - Ensuring users don't stay on QC too long



Future (new technology)

- QC costs very high – c£50k installed.
 - Nissan and others developing lower cost units.
- Conflicting standards may converge?
 - USA, EU and Japan have own connector standards.

next
greencar™

Home

Full Search

News & Reviews

Greener Fuels

Hybrid & Electric

Car Costs

Nissan to develop low-cost 'quick' charger

21.9.2011



Nissan has teamed up with leading utility and electrical [vehicle](#) supply equipment companies to speed development of cheaper, smaller, quick chargers for electric vehicles.

The primary intention is to reduce the costs of rapid DC charging units, and to [accelerate](#) the installation of publicly-available Quick Charge (QC) points in the UK and across Europe.

This agreement between Nissan, Circutor, DBT, Efacec, Endesa and Siemens is expected to result in a dramatic reduction in the price of the units – by over half to under €10K – paving the way for businesses such as service stations, [car](#) park operators and retail outlets to install quick chargers and run them profitably as a commercial enterprise.

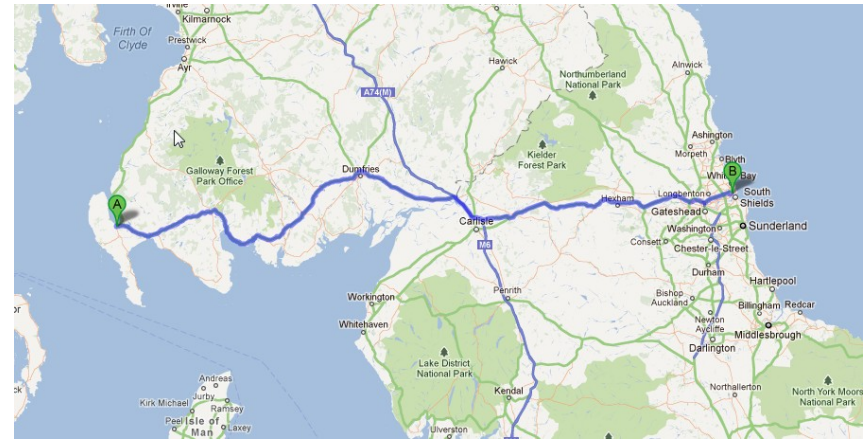
This will mean [Nissan LEAF](#) drivers, and other quick charge enabled vehicles such as the [Mitsubishi i-MiEV](#) or [Peugeot iOn](#), could conveniently use their vehicle for longer journeys and recharge the batteries to 80% capacity in less than half an hour.

As a result, it is expected that there will now be thousands of QCs across Europe by the end of 2012, and tens of thousands by 2015. This infrastructure will open up Nissan LEAF ownership to a whole new spectrum of buyers who occasionally need to do longer journeys.

A CHAdeMo DC quick charger delivers 50 kW of high voltage DC electricity straight to the battery, speeding up the charging process. There are currently several such chargers installed in the UK, mostly at Nissan [dealerships](#) but also under the One North East infrastructure scheme – however they are currently particularly expensive to purchase and install. To see the locations of current DC QCs, see our [Zap-Map](#).

Future (our plans)

- The northern QC corridor
 - QC is a fundamental enabler for widespread EV usage
 - A next stepping stone is to create a QC corridor from Northern Ireland, via Scotland & Cumbria to Newcastle
 - Can then drive from Dublin to Amsterdam in an EV



Conclusions

- We have come a long way
 - Several QC's installed and operating in the NE of England
 - Contributed to national and international standards committees
 - Demonstrated and piloted a back office system
- We still have issues to overcome:
 - Operational economics are unclear
 - Cost of overall installation is very high
 - Reliability could be better as users very quickly become dependent on the infrastructure.

CHARGE 
YOUR CAR
PARK + PLUG + RECHARGE

Trialing an Elecscoot demonstrator - www.elecscoot.co.uk