EV ASSOCIATION SCOTLAND

January News

Volume 1 Issue 2 December 2017

Diary Dates:

EVAS AGM: IET Teacher Building, 14 St Enoch Square, Glasgow, G1 4DB: 24th March 2018

Grampian Transport Museum EV Exhibition 1st April 2018

Evolution Roadshow Royal Highland Centre, Inglis-ton 5th May 2018

Inside this issue:

Festive EV parade becomes a fitting tribute to one of Dundee's EV ambassadors

Drive Dundee Electric organised a Festive EV rally on the 25th of November, celebrating the city's position at the forefront of the EV revolution, while increasing public awareness. Many organisations were represented, including EVAS, Dundee City Council, taxi and private hire firms, businesses with electric vans, the Scottish EV Drivers Club and several high-profile EV ambassadors. A variety of cars were out including Nissan LEAF's, Renault Zoe's, e-NV200's, Tesla Model S and X's, BMW i3's, a Kia Soul and a Hyundai Ioniq. One Renault Twizy from Perth was a welcome addition. About thirty vehicles took part in the parade. More impressive was the number of EVs that the parade passed that weren't taking part. EVs are now very much part of the norm here.

Drive Dundee Electric's Lynne Short announced the winner of the most festively decorated car, which was also the oldest by over a decade: EVAS member Evan Tuer's 1999 Peugeot 106 Electric, decked out with a wire reindeer head on the bonnet and full size, fully decorated Christmas tree, with working lights, strapped to the roof. The 106 Electric (one of only eight left on UK roads blew the competition away. The reward: a dinner for two at the DoubleTree Hotel.

Chris Ramsey of Plug-in Adventures All-Terrain Nissan LEAF, freshly returned from completing the 10,000 mile Mongol Rally, having become the first EV to do so. Sporting a roof rack, rally wheels, a raised ride height and eye-catching decals, it was no surprise that crowds gathered around.

Sadly, we learned that Dundee had lost one of its EV ambassadors, David Young of 203020 taxis. David's journey into EVs began when his grandchildren refused to get into one of his gas-guzzling sports cars. This gave David the foresight to investigate electric taxis for his business. He promptly trialled a range of models, including the Renault Fluence and BYD E6, before selecting the Nissan LEAF. He ordered thirty of them and built five rapid chargers at his base. The number of EVs has since grown, with plans to electrify all of 203020's fleet in due course. He was a true EV ambassador and will be sorely missed by EVAS and the wider EV community.

Make EVAS Local

Let us know if you want to form a local section. You'll need one Full Member as a point of contact to get in touch via: membership@eva.scot.
We'll generate a space for you on the website, and any member will be able to link in to your group from their profile.
To keep it simple, we think sections will initially cover council areas, but it is really up to you.
If you have anything you want published or promoted in the newsletter, then just send it in. For the AGM each year we'd want you to produce report back on your activities.

Alexander Dennis Bus Factory Visit

On August 10th, EVAS members met up at the ADL Factory in Falkirk, where we were greeted by Stefan Baguette. Stefan gave a very informative presentation on the work ADL are doing in the field of Hybrid and Electric buses. An explanation was given about the EV buses in service on two routes in London, operating out of Tower Bridge depot. These buses operate on a full day service with comprehensive depot charge management. The depot is very compact, with not every bay able to support charging, so a parking plan is followed each day to ensure that every vehicle carries sufficient charge for its scheduled runs. Depot charging loads total about 2MW, with several bays charging individual buses at 80kW via dual 40kW chargepoints.

After donning mandatory PPE, a tour of the factory floor in two groups was given.
The factory is split into production lines, with the first few producing hybrid three axle double deck units for Mexico at the time. A further line was set up for single deck EV's, with a distinctive battery hump on top. The chassis has BYD hardware, with 324kWh of battery. The visit concluded with a thankyou to Stefan for a comprehensive and enjoyable visit.

Transport Scotland Funding Update. Membership welcome pack

EVAS has now received funding from Transport Scotland to continue in our path of encouraging and supporting the uptake of EV's in Scotland.

As part of this we are targeting the provision of a new EV drivers pack with each new EV, which will include 1 years membership of EVAS. The pack will include a guide to using an EV, etiquette guides, a Parking Disc to show the expected end of charge as well as a welcome letter from the committee. We will be sending these out to every member Full or Associate that we have an address for, in early 2018. Please update your profile at www.eva.scot/profile if you want to receive one. You may see our recruitment drive in AutoVolt magazine as well. To fully represent all people interested in EV's, drivers, fleet operators, manufacturers and charge point hosts, we need as comprehensive a member group as possible. As we progress we intend to exert greater influence over the development of policy areas affecting EV's. We are your voice to the Scottish Government, councils, ChargePlace Scotland operators and beyond.

There will be some changes coming on the website and forums as well. To keep life simpler for everyone, these should only require one sign in. The old forums will still be there as an archive, but will not be active. Come along and say hello.

TRANSPORT SCOTLAND
CÒMHDHAIL ALBA

Most EV challenges are in the remit of Transport Scotland

Tell us more about your EV life on our forums and the Facebook group

ScottishPower Training Day

EVAS were approached by ScottishPower to provide familiarity training to drivers at their new HQ in Glasgow.

Euan McTurk

See more on Euan's EV history on page 3

Edinburgh Napier University Transport Research Institute hosts 3rd enlightening EV Conference

The TRI conference in October was well attended, with four EVAS Directors along with representatives of all the major Scottish EV stakeholders attending. One of the speakers, Euan McTurk of Dukosi and EVAS, shares more.

Professor Tariq Muneer started proceedings highlighting the scale and environmental implications of society's addiction to cars. Crucially, he compared the well-to-wheel efficiency of EVs to fuel cell vehicles, noting with EVs three times as efficient as FCEFs.

The keynote speaker was Transport Minister, Humza Yousaf, who gave a roundup of the progress that the Scottish Government has made with electric vehicle uptake, particularly setting a target 8 years in advance of Westminster. This was expanded on by Laura McCaig from Transport Scotland, as well as speakers from Charge Your Car and a number of local authorities, including Dundee. Interestingly, Humza's Q&A session emphasised how wide the definition of electric vehicles is, with representation from the Electric Boat Association and Dukosi highlighting the potential of batteries in all transport sectors.

Dr Mark Miller of Edinburgh University then explained in graphic detail how nanoparticulate matter from diesel exhaust emissions causes extreme damage to human health. Nanoparticulate matter from diesel exhaust enters the bloodstream and increases the risk of heart attacks, heart disease and lung disease. Dr Miller's presentation emphasised the serious risks presented.

I spoke for Dukosi and started by explaining the benefits of our battery management technology. Simply put, building and maintaining a battery pack will go from a rat's nest of cables , to playing with wireless, data-rich Lego bricks. This has additional advantages for manufacture, repurposing for Second Life applications and end of life recycling. The opportunity to show the audience that Scotland has an impressive network of businesses and universities involved in energy storage, including the largest battery prototyping facility in the UK . All of Scotland's main battery businesses have at least doubled in size over the past eighteen months, and demand continues to grow. Scotland is able to capitalise on the EV revolution, networking events such as the Napier conference will make it possible.

Commercially, companies are increasingly aware of the need to electrify their fleet. Kate Armitage of Route Monkey discussed the role of the firm's advanced fleet optimisation software in identifying routes suited to electric vehicles and enabling companies to make the switch. The software is also capable of redrawing a company's route map to optimise mileage and running costs, further highlighting advantages of EVs. Kate also noted that success of EVs in fleets translates into the domestic sector, since used fleet vehicles generating more affordable EVs for buyers on a budget.

The final presentation was by the ever-charismatic Tony Kenmuir of Central Taxis, the first taxi company in Edinburgh with electric vehicles. Tony focussed on the disruptive market of on-demand taxi apps such and forecasted the future role of taxis and how the public will interact with them. Unlike many taxi firms who are fighting against new developments, they are actively embracing it.

Once again, Napier University's Electric Vehicle Event was a huge success, with many enlightening talks from a wide range of disciplines, and stimulating discussions during Q&A and networking sessions. There was an unparalleled level of engagement and enthusiasm from everyone present, and all attendees will have taken home multiple ideas to enact within their own organisations, and the contact details of potential project partners with whom to explore new EV-based opportunities. Professor Muneer and his team have put on an excellent conference that, for the third year in a row, has helped to set the tone for the future of electric vehicle developments in Scotland. Long may this success story continue.

HES Events

energy saving trust

Over 160 people attended the two Home Energy Scotland events in Livingston and Cumbernauld in September. All four speakers were well received, with interest showing in the Q&A session that followed the presentations. Neil Swanson, EVAS Director, spoke on his personal experiences with his Leaf as a work car and the advantages a Solar PV system offers, in his case, largely free motoring at weekends. Neil is an engineer with a utility company and covers about 25,000 miles year in his Leaf.

HES have asked us if we will be prepared to provide speakers at future events, naturally EVAS said yes.

Scottish EV Pioneering

When the first wave of the modern generation of electric vehicles hit the UK after 2010, few people knew of the small number of their predecessors roaming the roads of Europe. Between 1995 and 2005, PSA Peugeot-Citroen manufactured 10,000 electric vehicles. Most ended up in continental Europe, commanding a premium of €10,000 even after the Nissan LEAF was released. Some made it to the UK in right hand drive. Unlike their continental counterparts, public awareness of these machines was minimal, with most machines struggling to achieve a fifth of the resale price of continental vehicles. For those in the know, or willing to take a punt, there were bargains to be had, as the Department of Physics at the University of Dundee discovered in 2009 when they bought a Peugeot 106 Electric.

Originally available to local authorities and businesses in the UK for £14,300, excluding the battery pack, which was leased at £100 per month. A grant of £5,000 towards the cost of the vehicle was available from the Energy Saving Trust. Several councils across the country leased fleets of these EVs, with the grand total in the UK reaching 151; the construction of the UK's first on-street charge point was brought about because of the Peugeot 106 Electric. Today, only 26 remain, with less than half still on the road. It was powered by a 120V, 12kWh NiCd battery, with cells split into three different locations: above the Electronic Control Unit (ECU) under the bonnet, below the ECU and under the boot of the vehicle. While the 20 kW DC motor powering the front axle may not seem high performance, its 127 Nm of torque made it exceptionally capable around town and also able to hold its own on country roads at speeds of up to an electronically-limited 60 mph. The transmission was single speed, with strong regenerative braking and a reverse button on the dashboard. Range was 50 miles per charge with charging via standard plug or commando socket using its 3kW onboard charger. Heating was provided by a petrol-burning heater.

The demise of the 106 Electric stemmed from a manufacturing defect in the NiCd cells. The separator between the positive and negative electrodes of the cell was poorly made, resulting in metal dendrites (branch-like growths) from one electrode puncturing the separator and internally shorting against the other electrode. Newly introduced EU legislation banned replacement cells due to their cadmium content. Despite being mechanically robust, most were repatriated by Peugeot and crushed, but some slipped the net, including examples with healthy batteries.

My 106 Electric belonged to Edinburgh City Council before being acquired by the University of Dundee. I was about to start my Honours year in Renewable Energy just as the car arrived on campus. It instantly caught my attention and, after pestering professors to let me work with the vehicle, I subsequently did Honours and Masters projects on next-generation lithium battery technologies involving the car (something that had never crossed my mind previously). Electric vehicles were still exceptionally niche at the time so the vehicle gained something of a cult following from students and staff. During this time, Alex Salmond visited the University to announce his party's transport plans during his 2011 Holyrood campaign, and took the vehicle for a spin.

The vehicle proved surprisingly robust for its age. Dundee threw two brutal winters at the machine, one of which likely froze the electrolyte in its cells when parked outside. However, once defrosted, the range was improved. When the auxiliary lead acid battery gave up, all that failed was remote central locking. By turning the key in the "ignition", the car fed its 12V circuit using its traction battery via a DC-DC converter. Something that would cripple a petrol or diesel vehicle was worked around in seconds. I drove it for a fortnight before I bothered to replace the dead battery.

I bought the vehicle from the University upon graduating, then, following an impulse purchase, it was joined by a twin from Portsmouth. Now studying a PhD in lithium batteries at the University of St Andrews, I had the aging NiCd pack retrofitted to a 140 V, 18 kWh lithium iron phosphate (LFP) battery pack, thanks to the technical prowess of fellow EVAS member Evan Tuer. Range was now 70 miles per charge. As well as lightening the vehicle by about 100 kg, the new pack was safer, zero-maintenance and less toxic than its predecessor. The upgrade included a digital

dashboard fashioned from an old airline in-flight entertainment computer and the replacement of the original Maréchal paddle charger with a Type 2 inlet to match modern charging infrastructure, albeit drawing 2.3 kW. The 106 commuted between Dundee and St Andrews, completing the 30 mile round trip on £1 of renewable electricity and saving upwards of £750 per year on fuel, tax and maintenance. Alas, after 18 years of motoring, the 106 Electric suffered a fluke fault when rainwater managed to seep into part of the upgraded - but not adequately weatherproofed - components, killing the battery pack. However, all of the original components of the vehicle still function. Now working as a battery electrochemist for an electric vehicle battery electronics firm in Edinburgh, I intend to revive the vehicle in the future with a cutting-edge new battery pack and Battery Management System. In the meantime, the 106 is on Display at the Dundee Museum of Transport, while I have upgraded to something a bit more contemporary.

Continuing the theme of buying EVs from higher education institutions, I purchased a 2014 24kWh Nissan LEAF from Edinburgh College, with the help of their Fleet Manager and EVAS member Bob Murphy. Whilst no stranger to the LEAF, having test driven it at arrive-and-drive events, the practicality of the vehicle surpassed my expectations. The torque and speed of the car make it surprisingly easy to accidentally stray over the speed limit; driving up steep hills on motorways and making sure that the throttle power doesn't exceed 20kW hammers home the value of that extra boost vs the 106 when you do press the pedal to the floor. The LEAF's range, combined with ChargePlace Scotland's ever-expanding rapid charge network (and the surprisingly quick charging times afforded by the 6.6kW charger), mean that it is more than capable of completing all of my usual journeys. My original plan had been to run my 106 Electric on short journeys, such as my 44 mile round-trip commute, and use my Mk1 Honda Insight hybrid to travel across to the west coast to visit friends and family. However, despite having the smallest battery option, my "short range" LEAF has proven to be so versatile that I now have to go out of my way to run the Insight once every couple of weeks to stop it seizing up on the driveway.

Cabin creature comforts have come a long way since 1999, so I've still barely scratched the surface of what the LEAF can do. I have gigabytes of MP3's at my fingertips, the ability to preheat the cabin in winter from my smartphone (saving the car's battery from being drained, while the car is still plugged in) and detailed telematics that help to improve my driving style and eke more miles out of a single charge. In contrast, the most advanced feature of the 106 Electric was a cassette player. A pedestrian warning sound is another noticeable absence from the 106 (perfect for sneaking up on people, as one of my old uni chums found out), although the brake pump compensates for this when it switches on.

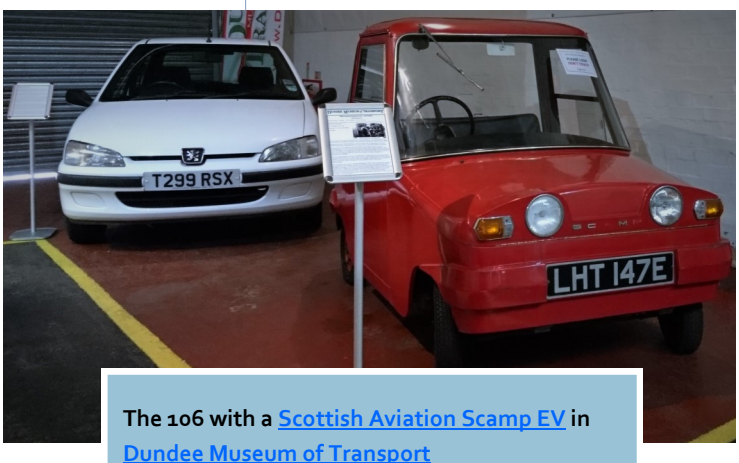
That said, the simplicity of the 106 had its merits as well as its charm; the LEAF's satnav is three years out of date and Nissan will charge a pretty penny to update it.

The LEAF is a more refined and practical EV than the 106, so it is no surprise that this hardy, dependable machine has become the world's best-selling electric car. However, there is an instant charm about the 106 Electric, with its tartan seats, goofy "Electric" decals and wildly sloppy negotiation of mini roundabouts, that fully justify the fan club that this plucky little car has amassed since I first got behind the wheel of it. Not one passenger has ever left that car without a big dopey grin on their face and a newfound appreciation for electric vehicles, even back when EVs were a hard sell. It is therefore a real shame that, unlike Nissan's ever-enthusiastic social media team, Peugeot are completely apathetic towards their electric trendsetter. I refuse to let this car be consigned to the history books, and fully intend to return it to the road as soon as possible. It isn't just my first EV, or my favourite; it's the car that launched my career.

Euan McTurk,

EVAS Member

and EV pioneer



The 106 with a Scottish Aviation Scamp EV in Dundee Museum of Transport

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Gairloch Highland Gathering

EVAS have been asked to provide an EV exhibition at the Gairloch Highland Gathering. This takes place at the Sands Holiday Centre by Gairloch, Wester Ross on Saturday 30th June 2018. Any members who can attend would be very welcome. Please email neil.swanson@eva.scot if you are interested.

Our Aims:

To represent the interests of EV users in Scotland.

To promote EV use in Scotland.

To be a collective voice to work with all Stakeholders to pro-actively identify and highlight the specific issues of ownership and driving EV's in Scotland and related infrastructure.

What we do:
We represent EV drivers at Government level. Bringing issues from not only our forums, but other complementary groups in the EV world.

In the next issue:

Winter tyres on a Leaf
Review of the new Leaf
A9 Electrification update.
Holiday EV experiences.
Profile of Doug Robertson

The Green Light

Hello all! My name is Bob Murphy and I'm the Electric Vehicle Administrator at Edinburgh College. I've also been part of EVAS since the early days, when one of the very first meetings was held at our Midlothian Campus back in 2012.

My role has let me see the renaissance of electric mobility from a first-hand perspective as part of a multi-award winning project. Our fully electric pool car fleet has been running since 2011 and continues to see increasing use as a green transport alternative for intra-campus and other business travel, while inspiring students and the public along the way.

It began as a research project at Jewel & Esk College backed with funding from SEStran, Midlothian Council and others. The goal was to evaluate a new generation of EV's from a real-life user's perspective and reduce 'Grey Fleet' fuel expenses from staff members using their own cars for business travel. A further aim was to integrate EV's with the college curriculum for the benefit of students and to meet the evolving needs of industry. Our first vehicles were four Mitsubishi i-MiEV's supplied by a local dealership. Two cars went to Jewel & Esk, while Midlothian Council and Stevenson College took another each.

In those first few months we encountered some of the major challenges that still impact EV take up. A lack of infrastructure and user's misconceptions to name but two. Our engineering students were quickly tasked with designing, building, and helping install our first charge points, while information sessions and questionnaires went some way to address range anxiety and other issues which came up from the staff. Potential users would ask things like "Can I drive it through a puddle?" for instance.

After the first year, data gathered from the small fleet of four Mitsubishi i-MiEVs was analysed and user experience reviewed by means of a follow up questionnaire. Results were impressive. Our project had demonstrated that the vehicles were viable, well-liked, reliable, with financial and environmental positives for the both college and research partners. The cars had travelled almost 14,000 miles, over almost 4,000 trips, saving £6,300 in fuel expenses and 2.6 tonnes of CO_2.

Based on the data from Jewel & Esk, a fully electric pool car fleet was deployed by the freshly merged Edinburgh College in 2012 to facilitate the necessary intra-campus trips round the four corners of Scotland's capital. Since then, the fleet has grown to sixteen vehicles including four vans, an electric minibus, and four of the latest BMW i3's. We still use Mitsubishi i-MiEVs, now in their 5th year, and we average around 9,000 miles per month with a user base of some 600 registered staff. The vehicles continue to supply mileage and trips data directly to our students, while they are also physically employed in classroom/workshop sessions, as well as at STEM outreach events in local schools.

It has been a hugely informative, challenging, and fun few years at the cutting edge while watching the EV industry evolve. I've enjoyed the sense of community and shared ownership, as well as the open, practical and collaborative approach from Transport Scotland through events such as the E-cosse forums and EV Roadmap. Overall EV use in Scotland has also increased since 2011 with some 5,600 ULEV's on the road now.

As we continue the trip, now that the 'tipping point' seems to have been reached, I look forward to sharing some insights and opinions with you all through this column and on social media.

So, thanks for reading, and I'll see you on the road!