

Arloesi Gwynedd

Community Electric Car Project Report

Year 1: Abergynolwyn & Bethesda 2019 - 2020



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Summary

This is a report on the first year of a two year community electric car project. The project is trialling a community car share model in rural communities and aiming to raise awareness of electric cars and promote sustainable transport options.

The project has funded two 40kWh Nissan LEAFs, branded and named Carwen and Carwyn. For the first year Carwen has been managed by Partneriaeth Ogwen in Bethesda and Carwyn has been managed by Egni Abergynolwyn in Abergynolwyn.

The project also funded an EO fast charger (a 7kW 32A single-phase AC charging point) for each community. They will be left in each location and have the ability to become a pay-for public charger in the future and generate income for the community groups.

Social enterprise car club Co-wheels has provided the two leased electric vehicles, telematics, insurance, booking platform and customer support. The partnership is a new one and our use case required a lot of customisation compared to their normal model.

During the year the cars combined had 199 bookings and were driven a total of 13,772 miles. The longest trip (by a non-admin user) was 520 miles.

The average booking duration (for non-admin users) was 10.9 hrs.

The most number of bookings from a single non-admin user was 14.

The energy used by the cars during the year has resulted in a 2.75x less Co2 being emitted than a combustion equivalent car, assuming a national grid average Co2/Kwh.

Only 36% of the electricity used by the cars came from the community group charge points, the rest was provided by public charge points. We expected that most journeys would be local and within the cars' range, however this shows that people were willing to take the cars on longer journeys and interact with the public charging network, in spite of its perceived difficulties.

After the initial launches, keeping the momentum going and marketing the cars was both a very important and time consuming job for the community groups. Regular meetings every 6 weeks between the community leads, AGW and ourselves were great for sharing ideas, learning and any issues.

The nationwide lockdown happened 4.5 months into the project, but both groups found ways for the cars to continue to serve their communities safely, from delivering local food boxes to meals on wheels from the local pub. After lockdown lifted, public bookings for the cars did not

recover to pre-Covid levels, and looking to the second year of the project there will need to be a continued focus on organised community services.

Both community groups feel the project has left an overall positive legacy in the community. It's raised questions and conversations on the standard car ownership model and changed mindsets about EVs working in rural communities. In Abergynolwyn members of the community have since bought their own EVs and in Bethesda Partneriaeth Ogwen are looking to acquire their own electric vehicle and electric bikes.

Introduction

Project Aims

The Gwynedd community electric car (EV) share project is a two-year project that set out with two main aims.

1. To trial a community car share model in rural communities

Can it help people who are currently isolated through lack of public transport to access local services and facilities?

The cars can serve those who do not have their own car and/or households that would like use of a second car occasionally. Through a team of volunteer drivers the cars can also assist those who are unable to drive, helping them reach medical appointments, for example, as well as social occasions, keeping them in touch with their local community.

2. To raise awareness of electric cars and promote sustainable transport options

EVs are much more efficient than petrol or diesel cars, they can be powered by low carbon renewable energy, have zero tailpipe emissions and are cheaper to run. By giving people an easy opportunity to try out an electric car themselves, the project aims to prove to local residents that people can use an electric car in their day-to-day lives and that it is a viable alternative to a diesel or petrol car. The increase in EVs on the road in Britain has been huge over the last 6 years (3,500 electric cars in 2013, to 227,000 electric cars end of August 2019) and it is important that Gwynedd's rural residents consider the benefits of electric cars, to themselves and to the environment.

Year 1 Community Groups

Arloesi Gwynedd Wledig put out an open call for interested Community Groups to apply to be part of the project. Each car would need to be managed, championed and promoted in a local community by a Community Group. They would also be responsible for organising and coordinating a team of volunteer drivers. There were 4 applications and the two successful groups were Partneriaeth Ogwen and Egni Abergynolwyn.

Partneriaeth Ogwen

<https://www.ogwen.org/en/>

Partneriaeth Ogwen are a social enterprise based in Bethesda, working for the benefit of the economy, environment and communities of Dyffryn Ogwen.

Project lead Huw Davies huw@ogwen.org



Huw (left) demonstrating the car to a potential volunteer

Egni Abergynolwyn

<http://abergynolwyncarclub.wales/>

Egni Abergynolwyn is a registered Community Benefit Society in Abergynolwyn, set up to consider suggestions, ideas and projects that help to reduce the community's carbon footprint, are eco friendly and can provide benefits to the village and community.

As part of their application they produced this video:

<https://www.youtube.com/watch?v=L8hkiySDLKM>

Project lead Steve Beech abergynolwyncarclub@gmail.com



*Egni Abergynolwyn committee members out for their first spin in the car.
Left to right: Steve, James, Jane and Liz.*

Who are we? (Amy & Glyn)

We are two local EV enthusiasts who are passionate about renewable energy, EVs and low carbon travel. One of the key motivators for us is that EVs provide a pathway to zero carbon transportation. We have been driving EVs for the past 4yrs, we currently own 2 second hand EVs and are very familiar with how they work and have plenty of experience in taking them on local and long distance journeys all around the UK and several longer trips in Europe (blog: <https://zerocarbonadventures.co.uk>). Glyn also works in the energy monitoring and EV charging sector (<https://openenergymonitor.org>).

We first approached AGW about replicating the Lake District's Twizy scheme (<https://www.visitengland.com/experience/explore-lakes-funky-electric-twizy>) as a fun and enticing way to engage people with EVs. However, although the Twizys provided the spark of inspiration, the project evolved into the Community Car Share scheme described, using the vastly more practical Nissan LEAFs. These provide users with a better insight into EVs, offering a more familiar and like for like alternative to diesel or petrol cars.

We are working as specialist support for the project.



*Charging our 24kWh Nissan LEAF at Shrewsbury rapid charger on a wintry journey.
Our home solar panel installation that helps charge our car with renewable energy.*

The cars

The cars chosen for the project are 40kWh Nissan LEAFs. They are 5 door, 5 seater cars with a good amount of boot space. They have an average range of 110-150 miles per charge, depending on driving style and conditions.

Inspired by the Renault Twizy scheme in the Lake District that gave their ‘flock’ of Twizys names and personalities, the two cars were given the names: “Carwen” and “Carwyn”.

Carwen has been based in Bethesda and Carwyn has been based in Abergynolwyn.



“Dec” a branded Twizy in the Lake District that inspired the project, and “Carwyn” one of our Community Nissan LEAFs

Initial Community engagement

After the successful applicants were announced, face to face meetings were arranged so everyone could meet and talk about next steps to get the project up and running.

Although the community groups were enthusiastic themselves, it became apparent in our first meetings that there were elements of their proposals that hadn’t been fully investigated with the relevant parties, or that some stakeholders were potentially not fully on board.

Both groups also had questions about the finances and payment schedules. This was understandable because the project information available to the community groups at the proposal stage was limited, with some elements not even fully known or decided upon.

Bethesda

In regards to Partneriaeth Ogwen, permission had not been granted from the Council for the installation of the charger at the library.

Abergynolwyn

In regards to Egni Abergynolwyn, the Canolfan were unsure whether they wanted the community car in their car park. This needed to be discussed by the separate Canolfan committee and their meeting schedule meant delays and uncertainty over where the car would

be based and whether the project could go ahead. The group did investigate alternatives in the meantime, but this added extra work and stress for them. The parking place was in the end agreed on at the Canolfan, but they imposed a hire fee for the car parking space, which was a cost that the community group had not already factored in.

Notes

Recommendation to highlight that the proposed home parking and charger location needs to be fully discussed with the owners of the site (if the community group are not the owners) and that the financial information is made clear in advance, so it can be taken into account when the groups are making potential arrangements with relevant parties.

Our more detailed understanding of the booking system and administration requirements can also be shared with the phase 2 communities in advance.

Charge Point Installation

Installing the charge points was a significant hurdle at the beginning of the project. While it is possible to charge an EV from a 3-pin socket a dedicated charge point makes charging much faster and safer.

The Nissan LEAF came ready equipped with both a UK 3-pin plug cable and a 7kW 32A 'type-2' EV charging cable ready to connect to EV charging stations. This cable is standard and will allow connection to any public charging point.

Installing the charging points took much longer than expected, recommendation to start the process as soon as possible.

Charge Point Requirements

We installed a 7kW 32A single-phase AC charging point, this is standard for an EV charging point. If three-phase power was available it may be worthwhile to future proof by installing a charge point capable of three-phase 32A / 22kW. At both sites only single-phase was available.

The actual charging speed for AC charging is limited by the car, the Nissan LEAF has a 6.6kW single-phase onboard AC charger therefore will be able to charge its 40kW empty to full in approx 6hrs, adding about 25 miles of range per hour of charging. In normal use the car will never be totally empty, therefore charging time will be less.

It was decided not to reserve time between bookings for charging since in both sites a public DC rapid charger was available a short drive away should a quick top up be required. To our knowledge picking up the vehicle without sufficient charge has not been an issue.

Unfortunately the current state-of-charge of the vehicle is not available on the Co-Wheels booking app, this would be a useful feature.

After consulting with the various stakeholders the following requirements were decided upon:

- 7kW 32A single-phase
- Per session & total energy monitoring
- Ability to set a price for public charging in the future when the community car moves to a new location
- OCPP - open charge point protocol compatibility to avoid vendor lock-in
- Active load management - to ensure the total grid supply limit at each site is not exceeded
- Minimal ongoing service cost

The ability to set a price of public charging in the future was a particularly troublesome requirement since this requires the chargepoint to have an internet connection and a back-office subscription to be part of a wider public charge point network. Internet connection was challenging at each site due to limited GSM connectivity (Abergynolwyn) and firewalled internal network (Llyfrgell Bethesda). It would be much easier and lower cost to install a charge point that does not have the ability to set a price for charging and collect payment. In this case the feature was required since the community were worried that since the community car in this project would only be with them for 12 months they would then be left with a charge point that could potentially be a financial drain if used by the public.

The community EV will have exclusive free use of the charging points without activation.

Charge Point Selection

Both sites had their own different challenges, however it was decided that the same unit would be installed at both to reduce complexity. The shortlist consisted of: PodPoint, Swarco and EO. Here's a brief overview of each offering as of October 2019:

PodPoint

- Well known brand, EV drivers familiar with the app
- Payment for charging made via the PodPoint app
- 4G Data unit - uses any network
- £5 per month back-office subscription
- PodPoint take a 1% cut of revenue generated by the charge point

-
- Active load management
 - Energy Metering
 - Not OCPP compatible

Swarco

- Favoured by Cyngor Gwynedd who owns building
- 3G connectivity
- Welsh language LCD display & bilingual signs (£68 extra)
- £850 unit + £110 load management + £125.00 commissioning + installation cost
- £200/yr maintenance fee + £220/yr back-office fee
- OCPP compatible
- Payment for charging made by Swarco app or RFID

EO

- £700.00 EO Genius unit + hub for load management and Ethernet connectivity
- OCPP compatible
- Active load management
- EO take a 10% cut of revenue generated by the charge point
- £25/yr subscription fee

We chose to go with an EO Genius charge point unit using our own 3G router to provide a data connection. EO was chosen since it met all the requirements and enabled the installation to be completed with our maximum budget of £2000 per site.

Installation

Installation of the units was done by EcoPlugg who are based in North West England. Unfortunately due to time constraints we were unable to find a local installer after being let down by one local installer.

Getting the relevant permissions and paperwork in place for the installation was time-consuming since both sites had complicated ownership and stakeholder arrangements.

Installation cost approximately £1000-£1200 per site.



Llyfrgell Bethesda



Abergynolwyn Gynolfan

Costs: Installation & Ongoing

Total costs per site where approx:

- Charging station & communication hub £700
- Installation £1000
- 3G modem & 1yr of GSM data: £30

Total per site: £1730 (ex VAT) / £2076

We slightly exceed the budget of £2k per site

The EO charging station cost includes 3yrs of back-office subscription, after the service will cost £25/month.

Charge Point Usage and Issues Encountered

Usage of the charge point was monitored using the EO portal which is very useful to provide live status and breakdown of charging session length and energy consumed. See car usage section of this report for consumption data figures.

EO Portal Screenshots:

Partneriaeth Ogwen		Bethesda Public Library				Hide Chargers	
Chargers							Charge session history
Bay	Serial	Max kW	Connected	Status	User	Energy kWh	Control
-	EG-01465	7.4	31:13	Car Connected	Grace Period Unlimited	12.39	Open
Export Charger List							

Advanced Filters

Drivers

Date From

Date To

My Drivers?

eoHubs

Bethesda Public Library						
Total Sessions		Total Revenue		Total Energy		
18		£0.00		168.70 kWh		
Hide						
Start Time	Duration (HH:MM)	Bay	Serial Number	Total kWh	Revenue	Driver
29/02/2020 18:58	43:36	-	EG-01465	31.51	0	No Sign In
28/02/2020 19:16	01:23	-	EG-01465	3.14	0	No Sign In
28/02/2020 18:52	00:02	-	EG-01465	0.23	0	No Sign In
27/02/2020 00:06	07:23	-	EG-01465	22.94	0	No Sign In
20/02/2020 14:25	90:59	-	EG-01465	12.14	0	No Sign In
20/02/2020 14:02	00:16	-	EG-01465	1.51	0	No Sign In

Initially the EO hub was connected to the internet via the Cyngor Gwynedd network in Llyfrgell Bethesda. The network was heavily firewalled and resulted in the hub often dropping offline, switching to a separate 3G modem resolved the issue. Once when the hub dropped offline the charge point became inoperable, this was a significant issue since the car was not fully charged before a user booking. Being local to the charge point I was able to quickly solve issues. Luckily the car has a backup 3-pin plug which could be useful if there was an issue with the charging point.

Working with Co-Wheels

Co-Wheels

https://www.co-wheels.org.uk/about_us

Why Co-Wheels?

Prior to launching this project, research was undertaken into how other community car clubs worked (see [Feasibility report for EV pilot scheme](#)). Having talked to existing EV hire schemes and shared transport specialists CarPlus, the most difficult aspect in setting up a scheme seemed to be obtaining self drive hire insurance. The most straightforward option to overcome this would be working with an insurance inclusive provider/partner. So Arloesi Gwynedd put out a call for providers to deliver the finalised project brief and Co-Wheels submitted the winning application.

Co-Wheels brings a wealth of experience and support to the project. They are the only independently-owned national car club, providing low emission, hybrid and electric cars on a pay-as-you-go basis for organisations and communities across the UK. They operate as a social enterprise and their primary focus is to reduce car ownership and create a cleaner environment by making lower impact transport options available to everyone. They manage a fleet of over 600 vehicles around the UK.

For this project they have arranged/provided:

- Two leased electric vehicles
- Telematics for the vehicles - i.e. so the car opens for the booked user only
- Smart cards for all registered members, which allows remote entry without the need to pick-up keys.
- Insurance
- Dedicated project page on their website
<https://www.co-wheels.org.uk/gwynedd>
- Bespoke online registration system and platform for 'Gwynedd car club'
<https://gwynedd.book.co-wheels.org.uk/auth/register>
- A bespoke price plan for the 2 cars
- A tailored price plan for registration and membership for community drivers (through a promo code used at registration)
- An online booking system for managing the cars' bookings (and over the phone during office hours (8am-10pm Monday – Friday and 8am-6pm on Saturday and Sunday)).
- Vehicle breakdown and recovery, and a replacement vehicle if necessary
- 24/7 support from call centre
- Monthly report showing the number of new members, the hours booked, the miles driven and a log of any issues.

Plus registered users become Co-Wheels car club members, so will also have access to Co-Wheels' other low emission vehicles around the UK.

Key contacts

Daniel Mearns: Location Manager

0191 375 1050

Daniel.Mearns@co-wheels.org.uk

Sarah Lambton: Fleet Co-Ordinator

Direct Line: 07921 397 518

Sarah.Lambton@co-wheels.org.uk

Rebecca Townend: Marketing Executive

0191 375 1050

rebecca.townend@co-wheels.org.uk

Contact for - Marketing, promotion codes, webpage content.

Andy Rutter: Products, Services & Business Implementation Manager

0770 215 7295

andrew.rutter@co-wheels.org.uk

Contact for - Implementation of car prices (hourly, daily, overnight, per mile), assigning the cars their location and making them 'live' for booking, setting up administrators (for block booking and free booking), setting up administrators for our platform on TripIQ (see information about Gwynedd Car Club members and bookings)

Co-Wheels processes

Registration

For a member of the community wanting to register and then book and drive the car:

1. Register with Co-wheels via the project's special registration link <https://gwynedd.book.co-wheels.org.uk/auth/register> using the **AGW20** promotion code. **This gives a £20 registration discount (making it £5 to register) and waives the £5 monthly minimum spend.**
2. Set up your driver profile (you will need your National Insurance Number and a driving license check code <https://www.gov.uk/view-driving-licence>)
3. Wait for your details to be verified
4. Receive your membership pack in the post with a smart card 'key' (or when registering, register an existing RFID enabled smart card that you already have to be your 'key' - for example, a contactless bank card)

-
5. Log in and book “Carwen” or “Carwyn” (or another one of Co-wheels’ cars across the UK) <https://gwynedd.book.co-wheels.org.uk/>

Notes

The purpose of our own registration page means that those who use it are automatically categorised as ‘our members’, so income from their registration will come to Arloesi Gwynedd. Their details will also appear on our Gwynedd platform (which we get back end access to). It does not affect the user experience. Anyone who accidentally registers using the Co-Wheels standard webpage (not our Gwynedd one) can still use the promotion code and book the car. They will just have to be manually picked up and recategorised by Co-Wheels.

Car hire prices

Hour - £3

Overnight* - £6

Day - £21**

Per mile - Free

***8pm-8am**

****Any 24hr period**

Notes

- These are our own custom prices for Carwen and Carwyn.
- For Co-Wheels’ system, the Overnight and Day rates needed to be set at a multiple of the Hour rate.
- Both community groups have had feedback from users saying that these prices were very affordable and gave great value. It shows that there would be scope for setting the prices higher for a permanent community car, maybe offering discounts or promotions at launch to encourage initial use. For this pilot project we wanted the cars to be very accessible and in use as much as possible so the cheap prices are a good incentive for this.

Admin access

Their email needs to be submitted to Co-Wheels, who will then send them an invite to register. This will avoid Admins paying a registration fee. Then it will be as step 2 onwards (from above). Users with an admin account can book both cars for free (ie. for a maintenance check - see below).

Notes

Admin users can add a personal account via Accounts > All accounts > Apply for a new account. This will allow them to book the car for personal use and pay for it.

If you have more than one account you can switch between them from a drop down account tab on your Co-Wheels dashboard.

TripIQ booking platform

A select number of users with admin accounts can also have access to the booking platform. Due to the sensitive personal data it contains Co-Wheels needs this to be limited to a few people for better data protection control.

Access needs to be requested, once Co-Wheels have confirmed this the user needs to do the following to access the platform:

1. Log into <https://gwynedd.book.co-wheels.org.uk/>
2. The URL bar will say <https://gwynedd.book.co-wheels.org.uk/my/dashboard>
3. Change the 'my' to 'admin' so it's <https://gwynedd.book.co-wheels.org.uk/admin/dashboard>
4. They will then be in the admin area.

Some areas are restricted, but we can see current, future and past bookings for the cars, plus User and Account information for all Gwynedd members.

Notes

You can change the filters to see bookings with different statuses. The filter works on a basis of returning results for all the search criteria combined so if you were to select 'started'

Bookings > All bookings > Filters > Status > Started

It will show all bookings that have ever been in the 'started' state at some time.

If on the other hand you select 'ended' & 'cancelled' expecting it to return all bookings that are currently either 'ended' OR 'cancelled' it won't. It will probably return zero results as it is looking for bookings that have been in both 'ended' AND 'cancelled' states at some point in time.

It's sometimes easier to remove all the status filters and do an export (this will run a report and email the user with a download link to a CSV file with all the booking data on).

Maintenance checks

It is the responsibility of the community group to complete the on-going cleaning and maintenance checks of the vehicle, otherwise known as 'Fleet Assistant' duties. For the first year of the project this has been scheduled for every 2 weeks.

As part of the contract Co-Wheels provides full training and advice on best practice for completing these checks. As part of this they also provide access and training for their fleet management programme, Fleetio. Fleetio is an app-based programme that leads the Fleet

Assistant through 45 point checks at each visit to the vehicle. This ensures that cleans are completed according to the set schedule, and there is a record of all elements such as tyre tread depth, mileage on the vehicles and any minor damage. Cleaning and checking reports for each vehicle are uploaded directly by mobile phone. If scheduled contact is not reported the system will raise an alarm.

Completion Date/Meter	Details	Total
Aug 19, 2020 11,279 mi ⌚ 59 mins		£0.00
Jul 23, 2020 11,087 mi ⌚ 31 mins		£0.00
Jun 23, 2020 10,531 mi ⌚ 59 mins		£0.00
May 29, 2020 10,230 mi	Clean and Check	£0.00
Apr 28, 2020 9,989 mi ⌚ 1 hr 18 mins		£0.00

A “Fleetio issue” is created in Fleetio, and a “due date” set, when any issues (such as damage or mechanical faults with a car) are either logged by the Fleet Assistant or reported by a member of Co-wheels. The Regional Manager, the Fleet Manager and the Fleet Assistant are all notified immediately if any issues are added to Fleetio, as well as when action is taken to close the issue.

Ideally a real check of the car using the Fleetio App would happen as part of the training session. There was a bit of a gap between the video call training, getting everyone registered with Fleetio and then the cars arriving, so a refresher was then required for the year 1 community groups.

Notes

Elements of the checks are not relevant for EVs and can be skipped.

Finance schedule

1. Co-Wheels takes payments for new user registrations and car hire bookings

-
2. Co-Wheels then pays this to AGW monthly, but works on a one month delay (example: August income from the car, paid to AGW start of October)
 3. AGW then works out the income for each community group (based on car bookings and member postcode for user registration fee)
 4. AGW pays each community group (example: August income from the car, paid to community group by end of October)

Notes

The community group are responsible for paying the electricity costs associated with the charger. Either directly as part of their usual utilities bill, or paying the relevant party if they are not the bill payer. They also need to factor in and schedule any other agreed costs - such as car parking space hire.

The community group needs to factor in the above payment schedule in their finance arrangements.

Vehicle guidance

As the 40Kwh Nissan LEAF was not one of Co-Wheels usual fleet cars they did not have a suite of 'how to' or guidance and support documents ready for it. They created a basic drive and charge document which we adapted, translated and co-branded. However, lots of people learn by seeing and doing, so AGW created a mini series of bilingual 'how to' video guides, to help support new EV users.

How to drive:

<https://www.youtube.com/watch?v=WdF5fm71uvE>

https://www.youtube.com/watch?v=_eXg84PvMZQ

How to charge at the home charger:

<https://www.youtube.com/watch?v=n9YHkMhqTO4>

<https://www.youtube.com/watch?v=WI2OAZvLj-0>

Partneriaeth Ogwen also did their own videos:

https://www.youtube.com/watch?v=ux9hblgVLE0&fbclid=IwAR3UJoKEYMul9nhUoW_vKlkximQI6K6mKNSpNdtBmYnivvjzV8IUF5QN8zQ

https://www.youtube.com/watch?v=ux9hblgVLE0&fbclid=IwAR3UJoKEYMul9nhUoW_vKlkximQI6K6mKNSpNdtBmYnivvjzV8IUF5QN8zQ

Notes

It would be good for AGW videos to be promoted/linked to early on for the second year of the project, so potential users are aware of them and can easily find and access them. Especially as social distancing will restrict in-person familiarisation demos.

Limitations of the Co-Wheels system and/or things to be aware of

- We have requested a 15minute buffer between booking sessions. This is sometimes not visible when initially trying to book the car. For example, if there is a booking 12noon-2pm, and you may be able to select 2pm-4pm. However, when you get to the next stage of trying to confirm the booking, it is not successful because the system 'applies the 15min rule' and the car becomes unavailable for your selected time slot. But you can make a successful booking for 2.15pm-4pm. A buffer is needed between bookings (we can't set it to zero minutes). The Co-Wheels standard for their other vehicles is 30mins.
- The telematics system in the vehicles needs phone signal to communicate with Co-Wheels. So if the car is out of signal, it will not get updates with bookings. This is generally not a problem if the 'home parking spot' has signal, since the car will get the updates when it is returned. However, we discovered it is a potential problem in a particular scenario: if someone extends a current booking while the car is out of signal, and the car then stays out of signal beyond the end time of the original booking. In this instance the car will not receive the update and therefore the user's smart card key will not allow access after the original time slot ends. In this scenario access can only be gained by a 'real key' or towing the car into signal. Having a 'real key' kept locally with a member of the community group will allow a 'rescue' to be arranged if the car is not far away.
- The smart card key has also sometimes failed to work for booked users while the vehicle is in signal. If this happens the Co-Wheels over the phone customer service are easy to get through to and can open the vehicle remotely for users, and are usually able to resolve any issues promptly.
- If the car is left open and unlocked for a long period of time (i.e. if it's left unlocked on a driveway while loading luggage and then the user gets sidetracked) the car 'times out' and goes into a safety mode and the user will not be able to put it into drive mode. This is to prevent it being stolen if accidentally left unlocked. To 'wake up' the car, all you need to do is touch your smart card key to the screen. However, the car prompts this with an image of a traditional key, so it can confuse users.
- If the car is left plugged into a charger and not used for a few weeks, there is the potential for the 12v starter battery to drain and the car not start. This seems counterintuitive when there is a full 40kwh battery in the car! However, the reason this can happen is that the Co-Wheels telematics are constantly checking for bookings and

updates and use a bit of power from the 12v battery. If the car is in use it will top up the 12v from its main battery, so it's not a problem. However, if it is not used and left plugged in for a long time it can't do that.

This was a particular issue in Bethesda and when it happened it required a breakdown call-out. The situation was challenging for the recovery service, but the situation was soon resolved and it was decided to give the car a short 'run' every few days during the lockdown period (when the vehicle was not being used regularly) to top up the battery.

Car servicing

CoWheels lease the cars from Arnold Clark who pay for the servicing of the vehicles. They agreed to allow us to have the cars serviced at B & K Williams Garage in Caernarfon who are members of HEVRA and on the one link invoice system so Arnold Clark could pay for them directly.

<http://www.bandkwilliams.co.uk/>

<https://www.hevra.org.uk/>

Working with Co-Wheels

Generally Co-Wheels have been very responsive to questions and working to resolve any issues and provide solutions where possible. However, in particular reference to the start of the project, the lack of continuity between the people involved in making the initial arrangement, and those involved in implementing the project as it went live, meant there was some confusion in certain aspects of the arrangements and how systems worked. These included

- Having bespoke rates for the cars
- Control over the sign up fee
- What income came to Arloesi Gwynedd Wledig (did the registration fee stay with Co-Wheels?)
- Having a view of the cars' booking calendar
- Having a different Gwynedd registration landing page to direct people to
- Discovering the appropriate contacts at Co-Wheels for various aspects of the project

With hindsight, a more comprehensive handover and a video call/team meeting initially between the confirmed deliverers at AGW, Co-Wheels and ourselves, could have enabled these to be revealed, worked out and then communicated more effectively early on.

As a new project for AGW and something that is not 'business as usual' for Co-Wheels, year 1 was inevitably going to be a test and trial year. So moving into phase 2, our two new community groups can benefit from what has been learned and the processes that have been established during year 1.

Community Launch

The focus of the launch events was to give members of the local community an opportunity to see and experience the car, find out more about the project, how they could book the car and/or become involved as volunteer drivers. The plan was for this to happen both by informal conversations and by more formal talks and Q&A sessions.

The 'draw' for the launches was both having Neil Lewis to give the headline presentations and the lure of free refreshments!

Launch talks by Neil Lewis

Neil is a Renew Wales Co-ordinator, Energy Local Manager at Carmarthenshire Energy and a self-confessed electric vehicle nerd. Neil has a background in community owned renewable energy projects across Wales and has a Masters Degree in Energy and Environment from The University of East London, but has also worked as a Dentist and as a Welsh Language Spokesperson for the Marine Conservation Society. His interest in clean energy comes from living his childhood on the edge of a very deep, open cast coal mine. He can be found on twitter as @lowcarbonLewis <https://twitter.com/lowcarbonlewis>

Neil's talks included his personal experience of EVs, community energy projects and some myth busting!

His day rate was £295 + accommodation. He charged each talk as a half day, even though he was here for 2 days as the talks were consecutive days.

Community car launch newspaper articles

<https://businesswales.gov.wales/walesruralnetwork/news-events-and-case-studies/news/community-electric-car-launch>

<https://www.bbc.co.uk/cymrufyw/50350151>

<https://www.bbc.co.uk/news/uk-wales-50318397>

<http://www.cambrian-news.co.uk/article.cfm?id=131152&headline=Village%20to%20get%20access%20to%20a%20community%20electric%20car§ionIs=news&searchyear=2019>

Carwen's Launch in Bethesda



Schedule

Saturday 9th November, 9am-1pm

Drop in and see 'Carwen' at Llys Dafydd Community Garden in Bethesda, 9am - 12pm. Take a tour of the community electric car and find out more about the project over a free panad.

At 12pm there will be a presentation by Neil Lewis, a self-confessed EV nerd and expert in the upstairs bar at Neuadd Ogwen (Welsh language with English translation via headset), with a Q&A at the end. There will also be a free tasty lunch afterwards (hearty veggie soup and roll provided by Caffi Coed y Brenin).

Marketing

- Email invites from Partneriaeth Ogwen
- Social media by Partneriaeth Ogwen (though no facebook event) & Arloesi Gwynedd
- Press release by Arloesi Gwynedd
- Fliers by Partneriaeth Ogwen



Attendance

Due to wet weather, around 10 people came to look at the car outside. The bad weather didn't encourage passers-by to stop.

Around 30 people came to Neil's talk inside, we think all came intentionally for the talk, rather than interested passers-by from Marchnad Ogwen downstairs.

Learnings

- Wet weather meant that people were less inclined to linger at the car, and not much passing foot traffic. A manned indoor hub (initially there was going to be a stall at Marchnad Ogwen) is key as a wet weather alternative.
- Reporter came to the launch, which then tied up Huw during the talk and meant the car was not available for the rest of the afternoon. Great to have the coverage, but would have been better to have had the press interview on a different day or a different time.
- Access the day before would have allowed room to be set up ready for the talk, and more people available to talk to the public during the morning.
- Having a flier with information about volunteering was useful to give out to those interested in getting involved.
- Having another/or combination flier also with the promo code and booking process would have been useful to handout, to help people look into it when they went home, as different to Co-wheels regular price package on their homepage etc.
- As well as Neil's talk, it would have been useful if there was also a presentation with project specific information - including booking process etc.
- Confirm catering and venue arrangements in run up to event. Huw was let down with the lunch offer.

Carwyn's Launch in Abergynolwyn



Schedule

Sunday 10th November, 12noon-4pm

Come and see 'Carwyn' between 12pm and 4pm outside Y Ganolfan and discover more about Egni Abergynolwyn and the community electric car project. There might be a chance of a spin in the car too! At 3pm there will be a presentation by Neil Lewis, a self-confessed EV nerd and expert inside Y Ganolfan, with a Q&A afterwards. There will also be plenty of free snacks and drinks throughout the afternoon!

Committee member Liz created this video of the event: <https://youtu.be/Hj9s4sLmuVw>

Marketing

- Social media by Egni Abergynolwyn & Arloesi Gwynedd
- Press release by Arloesi Gwynedd
- Fliers and posters by Egni Abergynolwyn, including letter box drop.

<p>EISIAU CYNNIG AR GAR TRYDAN? YN ANWYDDUS I LEIHOU EICH OL TROED AMGYLCHEDDOL? DIDDORDEB MEWN RHANNU CAR CYMUNEDOL?</p>	<p>FANCY TRYING AN ELECTRIC CAR? KEEN TO REDUCE YOUR ENVIRONMENTAL FOOTPRINT? INTERESTED IN COMMUNITY CAR SHARING?</p>
<p>Ymunwch â ni yn Y Ganolfan Dydd Sul y 10fed o Tachwedd (12:00yp tan 4:00yp) ar gyfer lansiad</p>	<p>Join us on Sunday 10th November at Y Canolfan (12:00pm till 4:00pm) for the exciting launch of</p>
<p>CLWB CAR TRYDAN ABERGYNOLWYN</p> <p>Dewch am ddreif yn Carwyn, ein 'Nissan Leaf' newydd sbon. Gweld sut mae o'n gweithio, siarad â rhai arbenigwyr, cofrestrwch ar gyfer y cynllun rhannu car neu bod yn yrrwr gwirfoddol.</p> <p>BWYD A DIOD AM DDIM.</p>	<p>ABERGYNOLWYN COMMUNITY ELECTRIC CAR CLUB</p> <p>Come for a spin in 'Carwyn', our brand new Nissan Leaf, see how he works, chat to some experts, sign up to Co-wheels car club or register as a volunteer driver.</p> <p>FREE REFRESHMENTS ALL DAY.</p>
<p>3yp: Sgwrs gan arbenigwr ceir trydan, Neil Lewis o Cydlynnydd Adfywio Cymru a Rheolwr Egni Lleol yn Sir Gaerfyrddin.</p> <p>Am fwy o wybodaeth anfonwch e-bost i abergynolwyncarclub@gmail.com, ewch i'r wefan www.abergynolwyncarclub.wales neu darganfod ni ar Facebook.</p> <p>YMWNHU A CO-WHEELS CYDA HTTPS://CWMNEDD.BOOK.CO-WHEELS.ORG.UK/AUTH/REGISTER</p> <p>Defnyddiwch cod disgownt ACWZ00 ar ymudwch i'r car.</p>	<p>3pm: Talk from self-confessed Electric Vehicle nerd, Neil Lewis, Renew Wales Co-ordinator & Energy Local Manager at Carmarthenshire Energy.</p> <p>For more information drop us a line at abergynolwyncarclub@gmail.com, visit the website (www.abergynolwyncarclub.wales), find us on Facebook.</p> <p>JOIN CO-WHEELS AT HTTPS://CWMNEDD.BOOK.CO-WHEELS.ORG.UK/AUTH/REGISTER</p> <p>Use discount code ACWZ00 for ES Membership!</p>

Attendance

50+ people dropped in throughout the day, and registered drivers took around 10 groups out for test spins. Good weather.

Around 30 came to Neil's talk inside.

Learnings

- Later start allowed set up in the morning and time for people to travel.
- Bunting and A-Frame gave a visual presence outside, and caught the eyes of those coming to the cafe.
- Having both cars meant that a car was always present if one was out on a test drive.
- Having a team of people from the community group there meant that there were enough people to provide drives, talk outside and also inside by the stall.
- Having the event at the car's home charging point meant we could demo how the charger worked.
- Learning from the day before, Glyn & I prepared a talk focusing on the project, the LEAF and practicalities re. becoming a Co-Wheels user.
- Having more time between the handover of the car and installation of the charger would allow the community group more time to get really confident with how it worked before the launch and talking about it to others.

Car usage November 2019 - end of February 2020 (pre-pandemic)

Usage Data (Both vehicles combined)

Distance

- Total: 13,772 miles
- Longest trip (non-admin): 520 miles
- Longest trip (admin): 729 miles
- Longest trip in 24hrs: 359 miles
- Average trip distance (admin & non-admin): 80.3 miles

Energy

- The community charge points combined delivered 1,400kWh of energy to the cars, which equals approximately 4900 miles.
- 36% of the electricity used by the cars came from the community group charge points, the rest provided by public charge points (mostly Rapid).

Bookings

- Total Number of bookings = 199
- Number of non-admin bookings = 145
- Highest number of bookings from a single non admin user = 14

Duration

- Longest booking duration (non-admin) = 64 hrs / 2.7 days
- Average booking duration (non-admin) = 10.9 hrs

Carwen (Bethesda)

- Odometer 28th Feb 2020: 8362 miles
- Approx. 1000 miles were done before the car was launched, therefore approx. 7362 miles from hire bookings.
- Average per month: 1840 miles
- Energy delivered by the community charger: 500kWh* = approx. 1750 miles
- Rate for electricity is £0.1488/kWh therefore total electricity is £74

Only 24% of the energy to drive the 7362 miles came from the charge point in Bethesda, the rest of the energy (76%) will have been provided by public chargers (mostly rapid).

This data correlates with the GPS traces (see below), Carwen (Bethesda) did lots of longer trips which required public charging on route. This is an interesting observation that people are choosing to hire a community EV when they need to make a long journey; this shows how important the public EV charging network is. People are obviously willing to take a community EV on a long trip and deal with the perceived hassle of rapid charging.

*Unfortunately because of the connectivity issues, the figure for energy delivered from the Bethesda charger was showing as 400kWh, which is a bit lower than it actually is, since the charger was offline for a total of 1-2 weeks and unable to report data. I estimate this figure should be more like 500 kWh, and I've used this estimation in my calculations above.

Carwyn (Abergynolwyn)

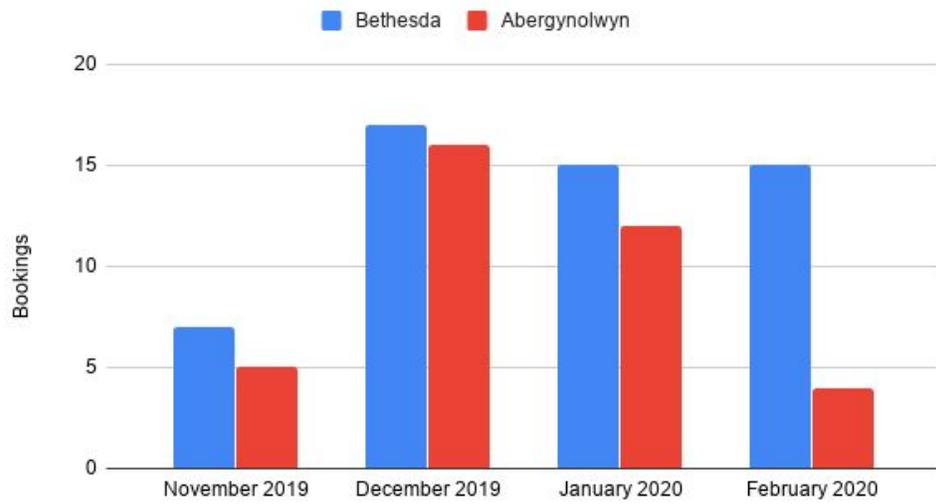
- Odometer March 2nd 2020: 5,410 miles.
- Approx 500 miles were done before the car was launched, therefore approx 4910 miles from hire bookings.
- Average per month: 1228 miles
- Energy delivered by the community charger: 900kWh = approx. 3100 miles
- Abergynolwyn community hall electricity cost: £0.15864/kWh for power, therefore the electricity cost for Abergynolwyn will be £143.

63% of the energy to drive the 4910 miles came from the charge point in Abergynolwyn, the remaining energy (37%) came from public chargers. Possibly due to the fact that Abergynolwyn is more remote than Bethesda, more people used Carwyn for short/medium length trips within the range of the car e.g Tywyn, Aberystwyth and Porthmadog. It has had some long trips, for example to South Wales, but not as many as Carwen in Bethesda.

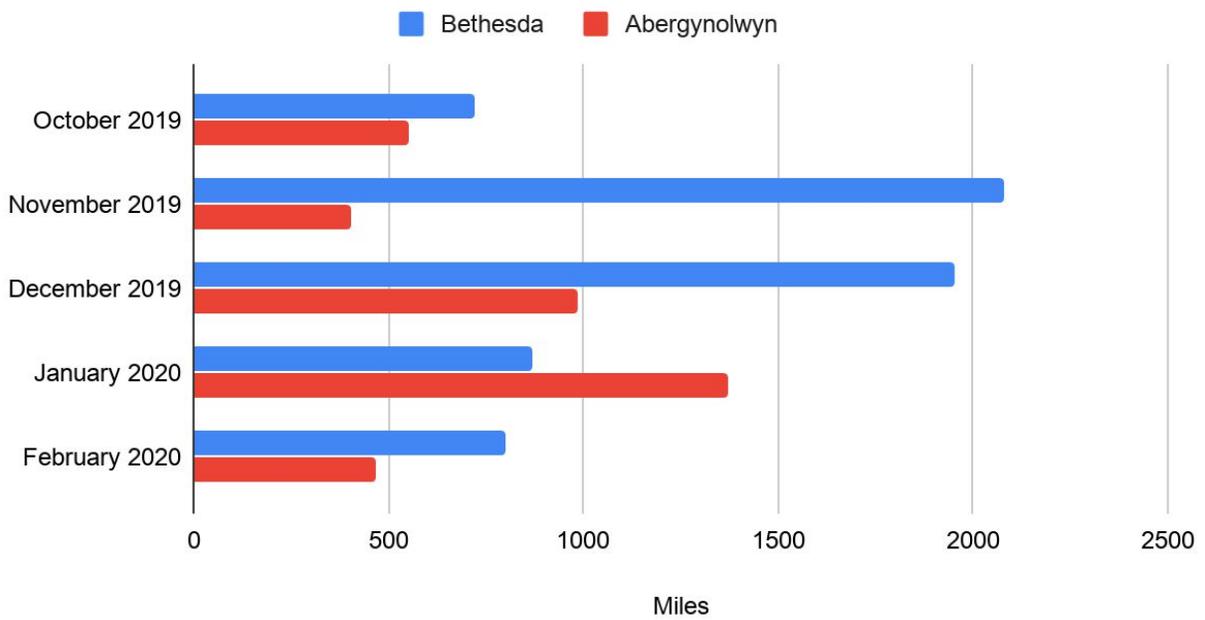
The posts from Abergynolwyn's Facebook group show a variety of case uses, from shopping, visits to family, business related trips, to outings purely to try out the vehicle.

Monthly hire comparisons

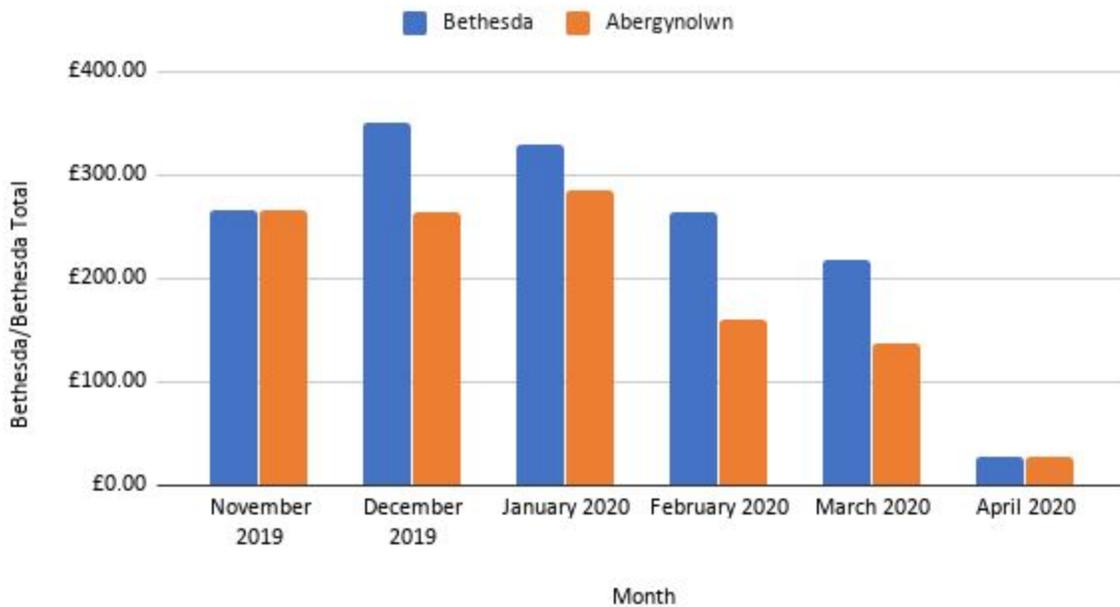
Bookings Per Month



Gwynedd EV Community Electric Car Distance Traveled



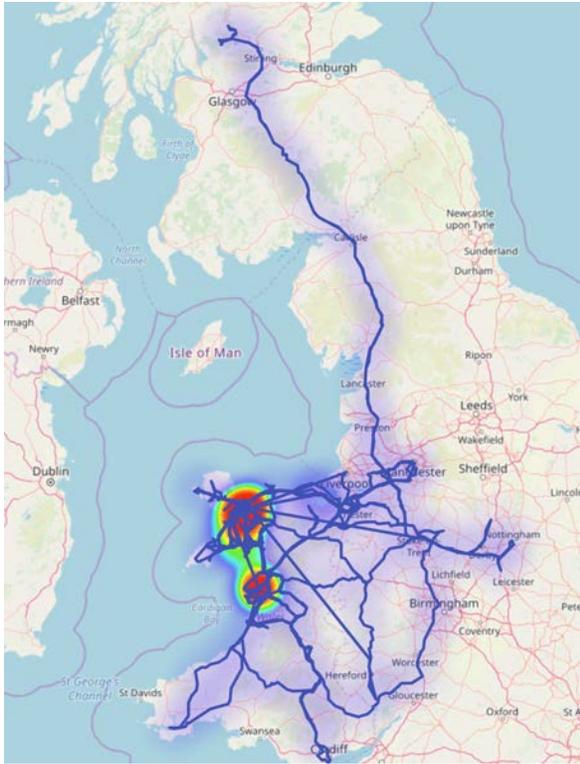
Total Income per Month (Membership & Bookings)



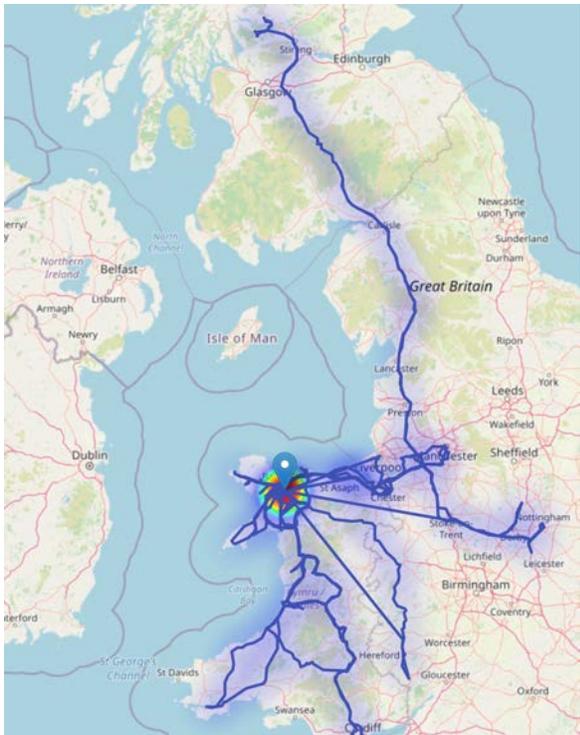
GPS tracking

OVMS (Open Vehicle Monitoring System) provided by OpenEnergyMonitor was installed in the vehicles to track the location of the vehicle. Data was logged to OpenTracks on a secure self-hosted dedicated server. Own tracks was used to create the GPS heat maps:

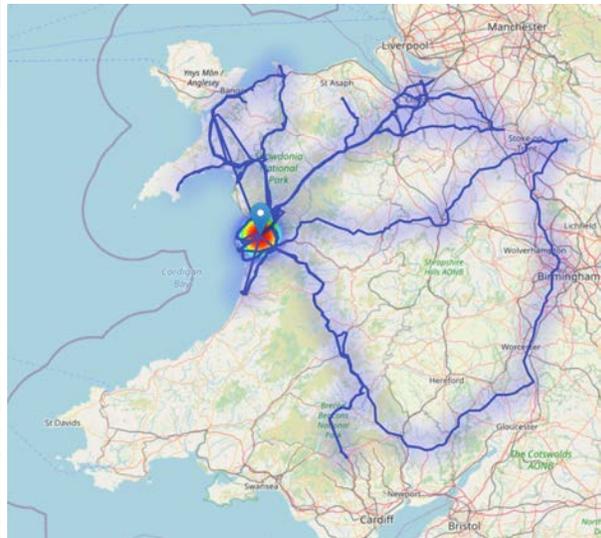
Here is a GSP heatmap trace of where the cars have travelled between **November 2019 - end of February 2020 (pre-pandemic)**:



Both cars combined

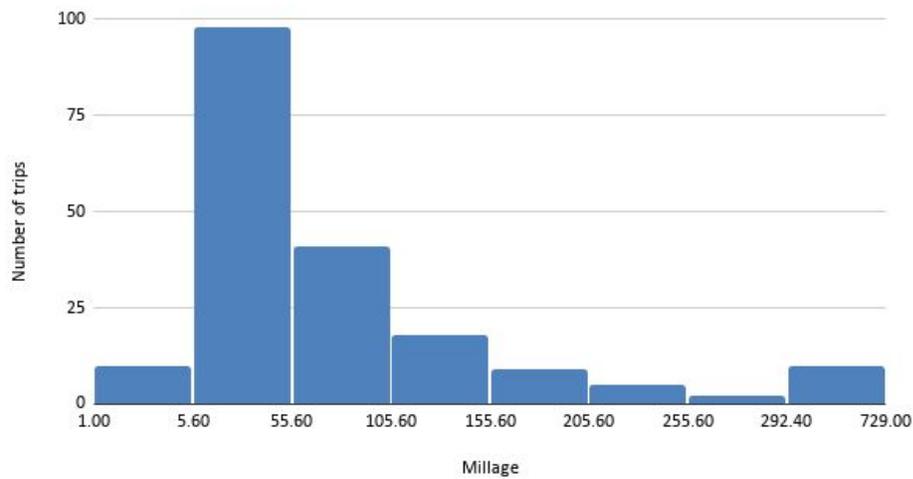


Carwen (Bethesda)



Carwyn (Abergynolwyn)

Trip Distance Histogram



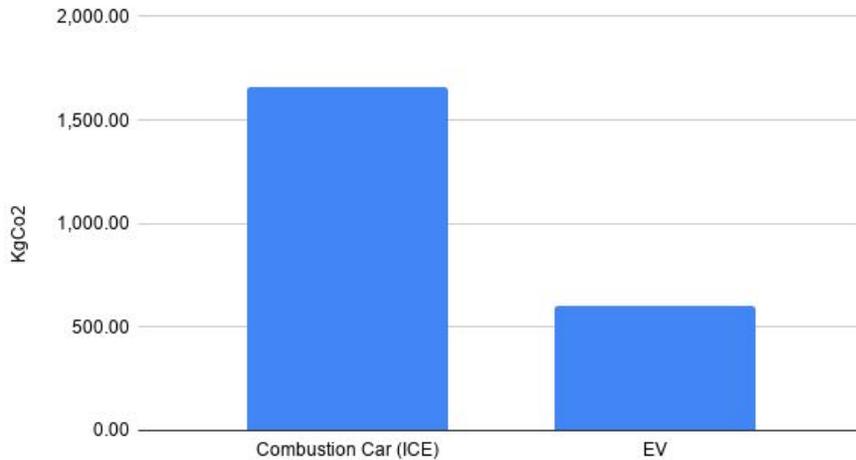
Carbon Savings

The two cars covered a total of 13,772 miles. The energy used by the cars resulted in a 2.75x less Co2 being emitted than a combustion equivalent car. This is assuming a national grid average Co2/Kwh. The actual emissions will be slightly lower since a proportion of energy was provided by solar PV in Bethesda with zero carbon.



PV solar array at the Llyfrgell, Bethesda

Co2 Emissions Combustion Car Vs EV (13,772 miles)



Assuming European average ICE car 74gCo2/mile | Assuming 3.5 mi/kWh and UK grid average carbon intensity in 2019 :245 gCo2/kwh

User experience and feedback

Bethesda

Partneriaeth Ogwen familiarised themselves with Carwen by jumping in at the deep end, using her on a Scottish Tour of 729 miles, to go to a conference in Aberfoyle, Strirling. They became familiar with driving and charging and on the return journey had less 'range anxiety' and were happy arriving at chargers with a lower state of charge.

Huw noted use cases of the car were varied, and examples include:

Mrs Hughes, Mynydd Llandegai had a trip to Bangor to start her Christmas shopping

M-sparc staff using for a conference in Chester

Menter Mon staff using Carwen for a meeting in Pembrokeshire.

Councillor Catrin Wager supporting the project by using the Community Electric Car

Grant Peisley of DEG noted:

“DEG is committed to reducing its carbon emissions and therefore has taken to using the community electric vehicle (EV) based in Bethesda for journeys that would otherwise be too costly or time consuming to use public transport.

We have taken the car to Cardiff, Reading and Brecon during the winter of 2019/20. That is some 1200 miles of clean electric transport. Saving 0.32 tonnes of carbon.

The journeys have mostly been trouble-free, partly due to thorough planning of the route and charging infrastructure to use. But there have been many opportunities to learn about the difficulties of using EVs in Wales. This was mostly evident when comparing the journeys in Wales with the journey in England, down the M6 to Reading.

Travelling to Reading we had many charging options to choose from depending when we fancied a panad and our risk appetite for running the battery low. Charging at services was straightforward thanks to apps on our phones which unlocked the chargers and allowed for payments. However, travelling through Wales was not so straightforward.

If travelling from the northwest to the south of Wales in an EV, our experience would suggest it is best to take a detour off the A470 and go towards Aberystwyth to charge both the travellers and the car at Cletwr services. The panad and cacen is always fantastic (as is the veggie breakfast!) and the charging is fast (50kW) and easy to use if you have the app on your phone. On the way to Cardiff and Brecon this was trouble free.

The only issue travelling south was getting to the charge point at the Metropole in Llandrindod (50kW). On the way to Cardiff we had to spend an hour and half at 10pm in minus 2 degrees in the carpark of the Carno Community Centre to ensure we had enough charge to get to Llandrindod. The cold weather meant we needed the heating on, and the battery isn't as efficient in cold weather. So, we wouldn't have made it without the slow charging available for free at Carno.

But that was nothing in comparison to the return journey from Brecon in March!

Having mis-understood a new type of charger, the car sat plugged in but not charging for the day while we worked. When we returned it only had 14% charge and that wasn't enough to get to Llandrindod on the way north. We had to head west to Llandovery and enjoy a fish and chips while the car charged. It was a nice detour through beautiful countryside, the charge was fast (50kW) and the fish and chips were good!

We travelled from Llandovery to Aberystwyth to charge at the University but when we arrived the charger wasn't working. We called the charger provider to see if they could reboot it and we could get a charge. After a long phone call and numerous attempts, the charger would not work. We had just about enough charge to limp to Tre-ddol to use the Cletwr services. Unfortunately, the shop and café were closed so we couldn't eat more cake. Worse yet was that the charger there was down too.

After half an hour on the phone, we were able to begin charging. The charge took about another half an hour. We headed north to find the road blocked due to overnight roadworks and had to return past Cletwr to Aberystwyth to get to the A44 and on to the A470. We used

the opportunity to stop again at Cletwr to top-up. Another 15-minute stop. With a full charge we had to head around Aberystwyth onto the A44, to the A470 and planned another late-night charge at Carno Community Centre's 7kW slow charger.

By this time, our rental period for the car was coming to an end and we were still a long way from Bethesda to return the car. We were worried that if we got out of the car to charge after the rental period ended, we would not be able to get back in! Co-wheels are always excellent on the phone, but it was out of hours, they were closed, and we were travelling through an area with no 4G to use the app.

Thankfully, we found a spot with 4G on the way to Carno and extended our rental period until the following morning. Just to be safe.

Another late-night visit to the Carno Community Centre car park gave us enough charge to get to Betws y Coed, providing we didn't use the heater too much and kept the speed at 50mph! We had left Brecon at 3pm and it was now 11.30pm when we stopped for our last charge in the Royal Oak Hotel, Betws y Coed (50kW).

We only needed 10 minutes in Betws y Coed to have enough to get the car back to Bethesda and hooked up on the Libraries charger. By the time I got home, the journey from Brecon had taken 10 hours and I'd aged 5 years I can't afford to give up!

This journey was not normal, it's not representative of what you should expect when taking an EV to south Wales and back but it is illustrative of what can happen in a country that has not prioritised investment in the infrastructure to support a transition away from carbon emitting travel. If Wales is to hit the targets needed to stop irreversible, catastrophic climate change, in line with the declaration of a climate emergency, it must invest in infrastructure to support the move to de-carbonised transport. Only when that has happened, will enough people be encouraged to drive electric to make the scale of changes required to meet our international obligations in reducing carbon emissions.

Catrin Wager, Cynghorydd Menai (Bangor) Councillor, Cabinet Member for Highways and Municipal and YGC:

It's been a pleasure to make use of Carwen; Ogwen Valley community electric car. I believe that the model of communal cars is exciting if we are to move forward to develop a sustainable, green economy for the future. We must move away from the mentality of one car to one person; that is not healthy for us or our environment.

There is still work to be done on promoting and facilitating community cars in my opinion. For example, you need better information about how to use the car beforehand, along with better guidelines on how to drive the car once you're inside.

There is also considerable work to be done on developing a better ordering system. It is essential to be able to check availability for example, as going through an app, trying to guess when the car is available, is frustrating.

It is also necessary to ensure that Carwen is always fully charged before any order. Once, I was caught out with a long journey to make, and Carwen didn't have enough energy to achieve it, which led to some panic!

But these are small things, which will come in time. The concept of community cars (and electric bikes) is exciting, and I believe that many challenges in terms of public transport, climate change etc. can be met by further developing this model. Ta-ta Carwen, I'll miss you!

Other comments included:

“We used Carwen for a meeting at CAT in Machynlleth. When we left Bethesda it was 3c and although the car was 100% charged it used 76% of the battery to get us there which was much more than anticipated, although there were four of us in the car. We charged the car, and with a nice warm battery and 8c temperature we travelled back using only 50%. A great learning experience.”

“Carwen was really useful for us with a young family. We feel an obligation to reduce our environmental impact and used her more than once for trips out, once going to Cheshire Oaks in Ellesmere Port for the day. It's quite spacious for a small car and made us really think of an EV as our next car. We're also very keen to support and be part of whatever green transport initiatives are developed next by Partneriaeth Ogwen”.

Abergynolwyn

Abergynolwyn setup a facebook group for the car which encouraged people to share their experiences and ask questions. Feedback captured from this group gives a great insight into what people thought of driving an EV and how the car was used:

“Great zero emissions day with Carwyn visiting Zipworld and riding the rollercoaster. There is a free charging point there which is a good job as I used up over 80 miles of theoretical range on the 40 mile journey home. But then I didn't use eco mode or the regenerative breaking. Drivers with heavy right foot beware! Lovely comfy ride though, and totally sold on the EV concept. Well done to all involved with getting this amazing project set up.”

“Well, after a bit of a sketchy start, due to Co Wheels finance dept, we were off shopping. I think it's fair to say we filled Carwyn to the max. This may become a regular trip to Porthmadog.”

“The Talylyn Railway enjoyed its first day using Carwyn to visit Portmeirion and Dyfi Distillery. Here is to more greener journeys”

“This is my feedback from using “Carwen” after my son booked it for the weekend. It's a long post I'm afraid...

- we took the charger lead just in case but didn't need it
- the EV had 3-4 adults plus shopping
- we went to Cheshire Oaks shopping 🛍️ then met friends in Cheshire for dinner 🍲 before returning home in the evening
- the weather was cold , between 3c and -3c
- we used “e-pedal” mode for increased energy regeneration

Pros:

- incredibly easy to drive
- very spacious boot
- very comfortable with plenty of leg room in the rear seats for adults
- good display, via ApplePlay
- good road handling
- responsive when needed
- using e pedal mode means you've got an electric hill start mode built in
- didn't need to use the foot parking brake, simply put it into “P- Park” mode

Cons

- the cold temperature really affected our range and knocked between 25-35miles off it
- all of the free charging points were full at the shopping centre , also full at M n S, so we used a free charger at the nearby Hyundai car dealership (apparently not a fast charge , but handy to know that many car dealers have these available)
- unfortunately it seemed that drivers of EV cars were leaving their cars all day in the charging bays in public car parks which is something to bear in mind
- we still needed more energy so ended up using the Shell Station Services at Crewe which had a fast charger of 50kw. This took 35 mins to get back to 87% battery (cost approx £4) and get a range of 125 miles but temperatures of -3c driving home meant we lost 30 miles off that range so just had enough to get back
- when my son went to return the car on Sunday a member of the public had parked in the allocated EV space so he had to find them so he could park Carwen and connect to charger properly

Would I use it again...yes definitely 👍

Would I use it on a long trip... yes but only after prioritising locations of chargers and checking the weather ❄️”

“Took Carwyn out for a little drive around the coast today. I've never driven an automatic car, nevermind an electric car, actually had to concentrate more on having no gears or handbrake I had no problems with the car being electric. Would happily use it again.”

“I took the car to Bangor and back today, with lots of stops - very successful trip. If you are interested in how I got on the carry on reading...

I went via Caernarfon to avoid the bigger hills and kept the speed right down, keeping the power in the "eco" area and using lots of regen going down hills. I arrived at Bangor services with 51% charge 2 hours later, I put the car on the Ecotricity charger, 20 mins later it was at 80% at a cost of £3. I visited my brother in Bethesda and come back to Bangor services for a little top up before driving back - I found a queue for the charger so I didn't bother! I drove gently back coming up the bigger hills at just 35mph, I arrived back at base with 21%.

What a smashing car! Thank you to everyone that made this possible”

“Once I'd worked out how to unplug him and get him started it was a totally enjoyable drive. Smooth, easy, quiet and so much fun accelerating on a clear road!”

“Drive report! Yesterday we went to Denbigh for Gymnastics competition and decided to take the electric car. We headed off about 7am and didn't expect to be back until 2pmish (7hrs). At £3 an hour this means it's as well to book for a 24hr slot at £21 and not have to worry about rushing to get back.

It was freezing yesterday so we put the heater on in the car and the girls had the radio on. I wasn't driving in Eco mode on the way (there's a green button just by your left hand). I think the round trip was about 110 miles and we'd have made it back with about 10 miles to spare I think. Anyway, stopped off at Rhug on the way home for a coffee and using the Podpoint app (downloaded there via 3G and topped up with a £5 credit) we added 20 miles to the range to make sure. <https://pod-point.com/>

Arrived back in Abergynolwyn and put the car back on charge.

Because we'd got the car booked for 24hours, we decided to head out to Tywyn to see the sunset later!”

James a volunteer on the Egni Abergynolwyn sub committee managing the car, also shared an extended post he wrote inspired by his first long EV trip:

<https://www.linkedin.com/content-guest/article/ev-motoring-its-adventure-north-wales-james-hodges-assoc-cipd-?fbclid=IwAR2Gwnpbrav5ZMy78YjlauzSI1EJUQvFOxzyfzWpK5-fVuoJ4FPZNxnOi78>

User comments on the facebook group not related to the car or journeys focussed on the Co-Wheels interface and booking system. Recurring themes included:

- Not being able to access the car when booked (due to the car not having signal and so not getting booking updates / Co-Wheels not being able to 'talk' to the car)
- Accounts being suspended (Co-Wheels suspend accounts if payment card linked to the system expires or does not work)

As well as being a cause of frustration, and the page being a platform to air them, a few users did also note that despite problems Co-Wheels are quick to answer the phone and are very helpful with trying to resolve problems.

Note

It has become clear that the home parking spot for Abergynolwyn is not great for signal. And as such Co-Wheels (and the project) has really relied on the local support of Steve, who has been available to reboot the telematics system and, if that fails, produce the 'real key' that can always gain access to the vehicle.

It really shows how important the choice of parking spot and charger location is. For future potential charge locations it will be great to be able to take the car there to test it in advance (something we were not able to do for the first community groups).

Through word of mouth we have also discovered that the car has been key in some local residents getting (or considering) their own EV.

Local resident Richard:

["The community electric car in Abergynolwyn definitely played a part in our decision making process.](#)

[We started thinking about EVs about 18 months ago as part of an increasing conviction that we need to do more to reduce our family's negative impact on the environment.](#)

[However we had never driven an EV and were unsure whether it would meet our family transport needs. All the local talk in Abergynolwyn about the community electric car helped our interest to develop. Also being able to try out EV life by using Carwyn for day trips from Abergynolwyn definitely helped us to realise that it could really work for us.](#)

[Consequently we placed an order for our own EV in January 2020 and our car arrived at the end of March \(just after lockdown\). Over the summer we have clocked up 3500 emission free miles and absolutely love it - no regrets at all. EVs are definitely the future."](#)

Sub committee member James:

“Having had the use of Carwen, and then loan of a Tesla Model 3, has made me consciously shift to wanting an EV for our next car and we are actively exploring options at the moment. Understanding how easy an EV is to operate, recognising that it’s about the Total Cost of Ownership of an EV (rather than purchase price) & that the charging infrastructure and range of cars are developing rapidly, all helped me in my understanding of EVs. My own experience of driving Carwen and the learning gained from that helped inform and accelerate the desire to go EV for our next car.”

User FAQs

With both cars there were some common stumbling blocks/FAQs from users using the cars for the first time. In response to this we included these in the documentation in the car guide folders, although some users do miss this/don’t think to check there.

The car is not switching on

Make sure you are fully depressing the brake pedal while pressing the start button (pressing the start button without depressing the brake pedal is equivalent to one click/turn of a key in a petrol / diesel car - you can get radio etc. but no drive).

The car is not moving forward

Make sure the car is in Drive (D) or Reverse (R). If the car won’t go into drive make sure the car is switched on properly (see above)

Where is the hand brake?

The ‘hand brake’ is the left hand foot pedal. Press it down to release (and it will come up) and press back down to engage.

The car is not starting after being left unlocked and / or

The car display is asking for a key

If you leave the car unlocked for a long period of time, it won't then turn on. This is a security feature in case a user forgets to lock it. If this happens the car display screen will ask for a 'key' and you will need to tap your Co-wheels smartcard on the windscreen. After doing that you will be able to start the car.

The charging cable seems to be stuck / I can’t get the cable out

You unlock/release the cable by pressing this button, down and right of the steering wheel:



When the charging flap is closed pressing this button will open the flap. When there is a charging cable plugged-in pressing this button unlocks the cable.

Note

Both community groups organised a drop in day for users to find out more about how the cars worked, where these points were covered. Repeats of this throughout the year would help catch people who become aware of the project at later stages.

Polar RFID charging cards

Through some initial long journeys that the cars went on, it became apparent that having a Polar card to access Polar rapid chargers would be very useful for drivers to offer maximum flexibility with route planning, especially Abergynolwyn. Most rapid chargers can be accessed via an app on a pay as you go basis, but Polar has a membership subscription model and its app for non members is very unreliable. After loaning out our personal Polar card Arloesi funded one card for Abergynolwyn and would reimburse Partneriaeth Ogwen if they decided to offer one with the car too.

Depending on the locations on the next community groups, it would be worth considering whether this will be worthwhile to continue.

Volunteer drivers

Both communities had people express interest in becoming volunteer drivers, but they struggled to get enough commitment for the service to get off the ground. And neither group managed to develop a volunteer driver service pre-Covid.

In Bethesda, Huw held Volunteer sessions at the Community Library and Marchnad Ogwen - 10 drivers registered.

Practicalities

For insurance purposes volunteer drivers need to be individually registered as drivers on the system, with their own smart card key, and make the booking on their account. Volunteers could be made admins so that they can make the booking without a fee. The community group could coordinate enquiries for volunteer drivers and then match them with available drivers. Payment for the booking would need to be made directly to the community group (because the user couldn't pay via Co-Wheels website themselves). The community group would need to make arrangements for this.

Volunteer drivers would need DBS checks and a training session with the car.

Covid considerations

In the current climate the role of volunteer drivers will need to be carefully considered, and alternatives looked into, such as volunteer drivers picking up shopping, prescriptions etc. (transporting goods rather than people), avoiding close contact inside the vehicle. The volunteer role, in whatever capacity is decided, will be formed using guidance from the Community Transport Association and be risk assessed.

Additional engagement and use opportunities

Bethesda

Carwen was a big hit for school visits. Sessions were carried out (alongside Cyd Ynni work on renewable energy) for local primary and secondary schools. Visits were very well received by teachers and pupils. Comments included:

“These are the next generation of drivers, it’s great that they’re being exposed to an electric vehicle”.

“It’s really cool, but it’s too quiet - it needs a big noisy exhaust!”

“I’m considering an EV as my next car - this is a good way to trial driving one without the pressure of going to a garage for a test drive”.



Community Voice Visit, Ysgol Dyffryn Ogwen



Carwen visited year 7 pupils at Ysgol Brynrefail

Huw had Initial discussions with Siôn Llewelyn, Gwynedd Council's Community (Adult, Health and Well-being) Connector on the possibilities of working together to provide Carwen for volunteer use to transport vulnerable residents to appointments and events.

Huw met with Bethesda Surgery to discuss trial health and well-being opportunities and how Carwen could support.

Marketing

Arloesi Gwynedd

Vehicle branding

Done locally in Penygroes.

<https://www.designersignsnorthwales.com/vehicle-signs>



Having a bold eye catching design has really made the car visible when out and about, and made the vehicle itself a great marketing tool and talking point locally, and further afield! An example of when it was spotted outside of Wales and popped up on social media:



Paul Dutton

Conversation starter · 23 mins

Has anyone seen this before? An EV car share club from Wales? Found charging at Knutsford. Wonder how the scheme works?



1

2 comments

Like

Comment



Paul Ruddock Interesting idea. <https://www.co-wheels.org.uk/pricing>

Social media

From the start AGW was active with engaging the public, making a call for names of the car, and doing video updates, from outlining the project to showing the cars' arrival.



During the project, AGW followed up and shared stories and photos of how the car was being used and where it was going.

We also created a film of the car driving past a local wind farm and solar farm to emphasise how the cars can be charged by renewable energy, lots of which is generated locally.

<https://www.youtube.com/watch?v=GgboY40b1RU>



The car driving past a solar farm

Note

Offering a go pro to booked users to film updates and get some natural video content and immediate feedback was discussed.

Community Groups

Bethesda

Created a dedicated project page on their website

<https://www.partneriaethogwen.cymru/en/other-projects/carwen-the-community-electric-car/>

Social media

Shared updates and photos of the car on their main facebook page.

Talking

Huw proactively showed the car to everyone he met with, used it to go to meetings and gave people drives in it to raise awareness and spread news about the project by word of mouth.

Press

Pembrokeshire Tour Innovation Radio Interview 09/12/20 - Aled Hughes, Radio Cymru



Fliers and posters

The team created A4 info sheets, with sign up details and prices that they circulated. They also had volunteer specific fliers.

Abergynolwyn

Website: www.abergynolwyncarclub.wales

Social media

Instagram (not really used) <https://www.instagram.com/abergynolwyncarclub/>

Facebook group <https://www.facebook.com/groups/652946965176422>

The community group set up a website with dedicated contact email address, an instagram account and facebook group. The Facebook group had the most engagement and generated natural content by users, as well as being a platform for the team to promote the car. AGW were able to pick up stories from here and follow them up with the relevant people and share wider.

Talks

Early on Steve gave a talk at Rotary club, which both raised awareness and generated income for Egni Abergynolwyn.

Press

The local press picked up the project at the start:



<http://www.cambrian-news.co.uk/article.cfm?id=131152&headline=Village%20to%20get%20access%20to%20a%20community%20electric%20car§ionIs=news&searchyear=2019>

Promo video

Volunteer sub-committee member Liz created an advert/ 'trailer' for the car, which was played at the local cinema:

https://www.youtube.com/watch?v=RYq8qp7F05w&fbclid=IwAR2LfvPK99YcAWi2rp-ZSq2xiq3Fs_dBIUZeSIPjcQesjVYufE8QL6zks68

Fliers and posters

The team created and circulated fliers and posters, including to local businesses, accommodation providers and attractions.

Business cards

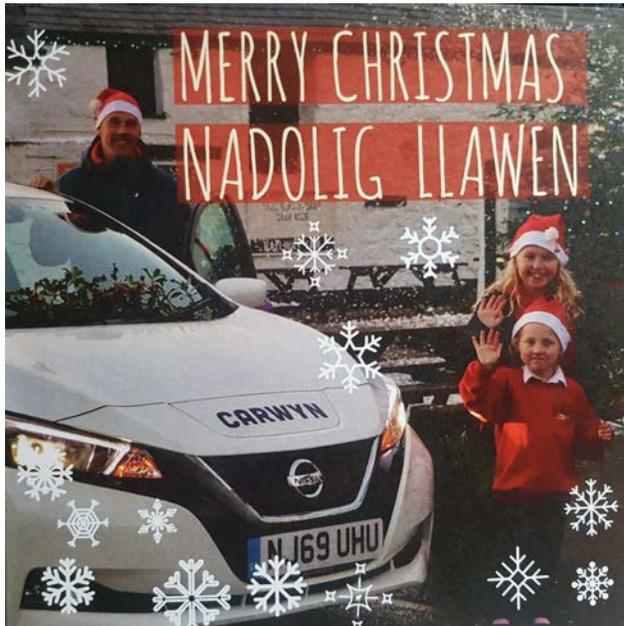
They designed bilingual cards kept in the vehicle for users to take and share.



Christmas card

The team created a Carwyn Christmas card and hand delivered them round the village, to help keep the project in everyone's mind during the festive season. The festive images were also used to promote the car on social media.

They also included 2 'golden tickets' - a free day's hire of Carwyn. However, no one came forward to claim the prizes.



Festive greetings from Carwyn, outside the Railway Inn

Car usage April 2020 - August 2020 (CV19)

COVID 19 has had a major impact on this project, and the groups in Abergynolwyn and Bethesda had to adapt the way the car was used.

Abergynolwyn

The local pub, The Railway Inn, used the car for a meals on wheels service, delivering meals around the area to vulnerable individuals who had to self-isolate. During the lockdown, the pub was delivering around 40-50 meals a week. They also collected and delivered prescriptions.



Gavin at the Railway Inn giving Carwyn a clean before delivering meals

The car was made available to the Railway Inn for free April-June and AGW covered the cost of the electricity for charging it during this time.

S4C news piece on the Railway Inn during lockdown:

<https://www.facebook.com/HenoS4C/posts/3026236307459856>

<https://www.facebook.com/HenoS4C/videos/578361539468811>

AGW interview with Steve Beech: <https://www.youtube.com/watch?v=Kr4D-ufyOoI>

Bethesda

During the lockdown, Partneriaeth Ogwen set up Cadwyn Ogwen, a partnership of local businesses that work together to sell and deliver their produce locally using the community car. The car was used to deliver local produce packages to the people of the Bethesda area, in a way that left no carbon footprint!



Carwen being loaded with local produce at Ffarm Moel y Ci as part of Cadwyn Ogwen

As the car returns to normal service, Partneriaeth Ogwen plan to book the car every Thursday to continue to use the car for Cadwyn Ogwen deliveries.

The car was made available for free April-June for this purpose and AGW covered the cost of the electricity for charging it during this time.

Cadwyn Ogwen website: <https://www.ogwen.wales/en/cadwyn-ogwen/>

Cadwyn Ogwen in action <https://www.youtube.com/watch?v=q3SPOz7nwUg>

S4C coverage of PO and Cadwyn Ogwen

<https://www.facebook.com/NewyddionS4C/videos/1158253084567275/>

AGW interview with Meleri Davies <https://www.youtube.com/watch?v=RR9v7bQJrfw>

Cleaning the car procedure - extra precautions during Covid

https://www.co-wheels.org.uk/co_wheels_vehicles_cleaned_with_long_lasting_virus_killer

<https://zoono.co.uk/pages/faqs>

As the country comes out of lockdown, the groups have been making arrangements for making the cars available for public use. We will be following Co-wheels' own procedures re. cleaning. The cars will be cleaned once a month and as part of that a Microbe Shield Surface Sanitiser (invented by New Zealand based Zoono) is sprayed in the car. Once dry, Zoono resembles a layer of microscopic pins that attract, pierce and kill pathogens – the same principle as a pin popping a balloon. And in the same manner that the burst balloon cannot be reformed, neither can the pathogens. Unlike traditional sanitisers that kill bacteria by poison or high alcohol content, Zoono is a water-based surface sanitiser applied as a mist then allowed to dry. Zoono stays active on surfaces for extended periods of time and helps keep surfaces and touch points protected for longer.

Co-wheels is still advising people to continue to take sensible precautions in terms of hand washing or using antiseptic gel and only sharing the vehicle with someone you are permitted to be with.

We will also review having a large bottle of hand sanitising gel and wet wipes available in the car for users to use if they do not have their own.

Feedback and reflections from the Community Groups

Bethesda

Notes from conversation with Huw Davies (Partneriaeth Ogwen project lead)

Overall experience

Having Carwen at Partneriaeth Ogwen has been very useful for us on many levels. Not only were we able to learn from Glyn and Amy and other EV enthusiasts about the practical elements, we were also then able to meet many other people interested in sustainable transport developments. The learning that has developed from Carwen has also been useful to us in developing our latest project, Dyffryn Gwyrdd, a three year National Lottery funded project aimed at tackling (amongst other things, transport poverty). The new project will

feature a wheelchair accessible electric vehicle and the experience of having Carwen means that we are very well prepared for the new vehicle which will arrive in 2021. Also, the visibility of Carwen in our community will be a springboard for us to develop other opportunities such as electric bikes which will further enhance Dyffryn Ogwen's green credentials.

Other discussions that happened indirectly as a result of Carwen's time in Dyffryn Ogwen were those around developing new community owned EV charge points and these discussions will continue over the next few months. Work was also carried out in partnership with the local Friends of the Earth group on translating and promoting the 'Bookmycharge' leaflet.

It has also raised questions within the community about the standard car ownership model and the viability of a community fleet model, as well as starting conversations about electric vehicles and charging infrastructure.

Successes

In regards to delivering the project, one of the main successes was engaging young people with the car by taking it to local schools. The visits tied in with work the schools were doing with Design and Technology and also the Sciences with renewable energy. It was great to have the car for hands on demos and provide an outside the classroom experience to help make it more relevant and engaging.

Lessons learnt

Reflecting on the year, it would have been useful to have had a specific facebook group for the car to build up an online community and have it as a platform for people to share their experiences, thoughts and photos, which would help keep the project visible online and in people's minds, as well as be a great record of feedback. Feedback has been in person, over the phone or via email and also just by chance meeting, so not all in one place nor visible to others.

Top tips for the next community groups

Don't be afraid to ask lots of questions - we asked a lot of practical questions about the car, things that now seem really obvious and simple but were not at first! Anything from 'where is the handbrake?' to 'how do I unplug the car?'. Getting familiar with the car is important so you can then share that knowledge with your community. Even if you have been given a demo, it's not until you are doing it yourself on your own that you can fully get to grips with it.

You will learn and adapt quickly - when we first received the car I was worried about everything, from keeping it plugged in overnight (from a security perspective), to using public charges. After that first night though the car was plugged in every night and soon after getting the car I took it on a long journey, which made me more comfortable with how it worked. I had range anxiety on the way there and was being cautious, but then was far more relaxed on the return journey!

Start a community car facebook group - Make it separate from your normal page and encourage feedback on there.

Abergynolwyn

From Steve Beech (EAE Car Club Sub-committee chair)

Overall experience

As project lead for the Community Group I think that the outcomes of the project need to be considered over 2 periods of time: pre- and post-lockdown due to Covid-19.

Prior to the Covid-19 induced lockdown I think that the project was very successful.

A well-attended launch event on Sunday 10th November at Y Ganolfan, Abergynolwyn very effectively introduced the project to the community, and the speaker (Neil Lewis) was great at communicating the potential benefits to the community. There had been some negative attitudes towards the project within the local community and it was great to see both supporters of the project and those less convinced at the event. The feedback from the event was generally really positive, and the ability to go out for a trip both of the cars was a real bonus and started the process of getting people to think differently about electric vehicles. I think folks were genuinely surprised that the car was so lovely to use and it was helpful to have Glyn Hudson enthusiastically explaining and advocating for EVs as he took people out on short trips.

An early use of social media (Facebook group, Instagram and Twitter feeds) also helped to communicate the project both to the local and wider community. We had comments and feedback from people across the UK. We also communicated the benefits through one-to-one conversations with key individuals in the area, as well as leafleting in the surrounding areas to include people who were not on the internet.

After the hype of the launch the project continued to encourage discussion and debate about the car - how it would be used, who would use it, would it run out of batteries etc? The Facebook group worked well at providing information about using the car as well as feedback from people who had used the car. Discussions about journeys undertaken, how the car drove, any issues encountered etc. were really useful at persuading doubters to give the car a try. This feedback from the users of the scheme was an important driver in the wider adoption of the scheme, with passengers of the vehicle soon becoming drivers themselves.

Further advertising of the scheme was done through Christmas cards, sent to all members of the local area, business cards which were placed in the car as well as being handed out at

events, and a promotional video was created by Liz Hutchinson (Hutchfolk Media) which was shown at the local cinema before films started and also published on Facebook. We took the car (with promotional materials) to a local environmental event (Sustainable Mach – Sunday 30th November 2019) where it garnered a lot of attention. We also presented the project to Tywyn Rotary club who were keen to support the project.

The car was well used during this period - it seemed to be out several times a week and some people noted that it was already booked when they wanted it. Generally it was kept fairly clean by users - only once did people leave litter in the car. At first it was somewhat difficult to tell exactly how much the car was being used as we didn't have access to the car-specific data, but this improved during this period. During the first 3 months the car was booked out on 44 separate occasions covering over 7000 miles.

Things all changed Post-Covid with the community not being able to share the car due to social distancing concerns and the need for rigorous safety / sanitising procedures / safeguarding measures. It was quickly decided that we should try and make best use of the car for the community in other ways.

The Railway Inn, Abergynolwyn had started to do a meals-on-wheels service to the village and surrounding areas and were driving a large 4x4 vehicle, so it was thought that this would be a good thing to support. The car was then made solely available to the Railway for this purpose.

We're currently re-introducing the car to the general public for the last 2 months of the year-long project and will be applying to host the car for a second year.

Successes

The main success of the project as far as I'm concerned was highlighting the benefits of electric vehicles within the community. There has been a tendency to think that EVs are really only suitable for cities, where journeys are typically very short and so battery-life is less of an issue than more remote locations where long journeys are the norm. However, the project highlighted the fact that it is possible to use electric vehicles in more rural areas, and also that the infrastructure around EVs is expanding rapidly

Another success is bringing a small-scale flexible, relatively low-cost community transport initiative, in the form of a community car, to an area in South Gwynedd where the availability of public transport is limited, providing better support for local people (largely an ageing population) and helping them access services and facilities. The Railway Inn delivered between 40 and 50 meals per week during the 5 month period they were using the car.

A further success from the project is the creation of connections between various local organisations - Egni Abergynolwyn Energy, Menter Mon, Gwynedd CC, Community Transport

Association, Renew Wales, Cletwr, Llanidloes Car Club, Greener Tywyn, Sustainable Mach etc. There's a real need for new thinking in rural transport and it's been great to see the support for the project from a wide range of groups who can work together to address the issues. This project offered a great opportunity to create links between Egni Abergynolwyn Energy and the local community, in particular the relationship between EAE and the Canolfan Committee – a relationship which will be of particular benefit as we continue to work towards improving the area's infrastructure and carbon-reduction capacity. The installation of the electric charging point, and the siting of the community car at the Canolfan has helped to reinforce the Canolfan's position as the hub of the community.

A good indicator of the success of the project thus far has been that two residents of the village have bought EVs after using the project's Nissan Leaf. James Hodges bought a hybrid car, and Richard Beard bought a fully electric Tesla.

Covid presented the project with some unique challenges and I think that the way the project pivoted to make best use of the car during lockdown was as good a solution as we could find. The car continued to remain a useful asset to the community despite the fact it could no longer be shared.

Lessons learnt

A project like this requires a lot of work from both the local community and those organisations supporting it. Within the local community certain roles must be fulfilled;

- Community Project Coordinator - someone that can be called upon to answer questions and sort out any issues with the car. Ideally they need to live near the car so that they can get to it quickly if someone is having issues. We had many occasions where users simply couldn't access the vehicle, and it was useful to have a key held locally.
- Maintenance Person - responsible for cleaning/checking/recording use of the car. We had issues with the communications devices in the car failing and it was necessary to disconnect the battery and work through a diagnostics process with Co-Wheels.
- Communications - Setting up and keeping on top of social-media to support the project and encourage use of the car. This role is quite intensive at first (getting set-up) and requires continuing dedication to keep the project visible.
- Funding - Attend meetings with partners/wider-EV projects in order to learn about and apply for funding opportunities to support the project. Mentor Mon have been incredibly helpful and supportive during the project, and we've also received support from Renew Wales, Community Transport Association, Gwynedd County Council, Llanidloes Community Car Club. We've had meetings and attended events with many other interested parties.

Personally I've struggled with a lack of time to dedicate to the project due to work commitments (and injury) and I feel that it would be helpful if there was a paid role within the community to take on most of the commitments listed above.

It might be advantageous to widen the scheme to increase take up and longer-term feasibility of the scheme / share some of the work of maintaining and co-ordinating the project.

Another way to increase the impact of the project might be to provide support to build / strengthen the committee running the project. A scheme like this requires a considerable amount of work, and as a committee we've tried our best to fulfil the requirements, but I feel that Arloesi Gwynedd could provide some more guidance, especially for committees not used to such projects.

Top tips for the next community groups

1. Build support within your community - get a passionate group together to support the project - it takes time and energy.
2. Forge good links with other organisations delivering EV projects in the wider community – i.e. look beyond your immediate community and use the wealth of expertise that exists out there.
3. Seek funding to support the project. Administration roles might be easier to sustain if they are funded.
4. Make good use of social media. The car is an attractive vehicle and looks great in photos – get drivers to help promote the scheme by getting them to take pictures and share them online.