



Clim-ATIC: Climate Change - Adapting to The Impacts, by Communities in Northern Peripheral Regions

Workpackage 4 - Adaptation Demonstration Projects

Work Plan

1. Project Description

WP4-S1

Demonstrating shared community use of a sustainably fuelled vehicle in a rural area.

The project will demonstrate the practical aspects of the rural use of a community shared, used and administered Electric Vehicle (EV) in Cairngorms National Park (CNP). Based in Aviemore, but available and widely demonstrated around the Badenoch & Strathspey (B&S) area, it will be available to residents in the locality through the Badenoch & Strathspey Community Transport Company (B&SCTC). The project will run from January 2009 until February 2011.

B&S is 1,600sqkm in area and has approximately 12,000 residents spread over several small towns the biggest being Aviemore. There are 1.4million visitors a year to the Park, around 1 million to B&S.

The area is remote and rural, but benefits from a mainline train link to Inverness (40 Minutes by train) and Edinburgh & Glasgow (both around 3 hours away). There are also inter-city buses and a local bus network to some villages. Most people arrive by, and rely on, a car.

The area, like many rural areas, will be affected by changes to the environment and economy caused by climate change and adaptation will be required sooner rather than later to minimise the impacts. With the distances involved in living, working and visiting the Park, transport is a vital part of life. It is one that is becoming more expensive, and being increasingly recognised as damaging to the local and wider environment. Currently fossil fuels are used to power trains, buses and road vehicles. It is expected that both a demand for better environmental protection and economics will slowly drive a shift from fossil fuel for transport use, but adaptation to new forms of energy is urgently required.

Fossil fuels are supplied globally on a large scale and thus their supply is vulnerable to disruption – climate change impacts are very likely to disrupt global supplies either directly through extreme weather events or indirectly through civil unrest as conflicts arise over limited resources.

One solution is to move to an electric vehicle (EV). This can be powered in a number of ways all of them more efficiently than an Internal Combustion

Engine (ICE). Power can come from green sources via the National Grid, or locally produced renewable energy. It can be refuelled at home or work reducing the need for vulnerable fuel infrastructure, fuel supply & transportation. Cost is far lower at around 1/10th of the cost of running an ICE allowing residents and visitors to adapt to Climate Change through reducing the percentage of their budgets on transportation.

The impacts of climate change, particularly extreme weather events are likely to increasingly affect travelling conditions. The current dependence on, and high ownership of vehicles has already resulted in a number of recent grid lock or traffic jam situations on main routes within the Highlands as a result of recent extreme weather events e.g. damage to bridges at river crossings.

One solution to this is to move away from this high car ownership mentality and to look at sharing the use of a car within a community. In this project the Electric Vehicle will be used by a number of volunteer drivers on a system administered by the Aviemore by the Badenoch & Strathspey Community Transport Company (B&SCTC). They already administer 70 volunteer drivers who use their own cars to give lifts to mainly elderly residents. B&SCTC will lend the EV out to its volunteers for their use replacing the use of ICE cars. The EV will be shown to visitors and residents at local Games and Shows.

The EV will be bought and converted by a specialist engineer based in Wales, John Lilley of Dragon Electric Vehicles. He is currently the only specialist in the UK able to carry to this work. Following investigation to find potential EV suppliers and standard car converters in the UK, a tender was issued to 3 potential specialists in summer of 2008 which resulted in only one supplier being able to provide the services and specification required. Perth College – UHI will purchase the EV and be the owner for the duration of the project, and in February 2011 it will be sold following the correct depreciation and selling rules of both Perth College and the Northern Periphery Programme. It is estimated that the final value at this stage will be approximately £5,000. It is the intention of the Cairngorms National Park Authority to put a funding package together at that point to be able to bid for the EV, and if successful present it to B&SCTC to continue using it as part of their project.

There is currently no EV use or re-charge network in the area, and there is a knowledge gap in what EVs can achieve. Lack of knowledge is affecting people's capacity to make informed adaptation decisions in response to Climate Change. In the UK, EV current activity is urban-based. With the improvement in range of EVs it is now possible to demonstrate their use in remote, rural areas. The project will aim to raise awareness of electric vehicles, as well as other sustainable fuels and promote car sharing by moving the EV around B&S to showcase it in different villages. It will also be widely marketed at local Highland Games and Shows, and taken to schools and relevant organisations. The car will be branded with the Clim-ATIC and project partner logos. A media strategy will be developed to maximise publicity.

The project will begin to build a network of EV recharge points, putting in the infrastructure to encourage new EV owners and visiting EVs. These Elektrobay points will re-fuel EVs via a 13amp connection. The project's EV will also have access to outdoor recharge points including a fast-charge facility. This is important, as the range is 140km, or around 3-4 hours driving. To get the best use from the vehicle it will be rechargeable over a lunchtime for extended use. In addition the project will purchase a trailer and a small wind turbine that will be able to contribute to the charging of the EV when parked. It is recognised that this element of the project will be unable to fully meet the charging

demands ,but depending of wind conditions and charging time the demonstration of such a piece of equipment with give added value to this project. It will also certainly help raise the profile of the EV at events.

The project will demonstrate the positive aspects of rural EV ownership and operation. This is easily transferable across other rural areas and does not rely on a National Park situation. An important part of the project is promoting transnational cooperation in getting more rural EVs and visits will be sought and encouraged from other countries. Although the other two Clim-ATIC transport themed demonstration projects are not EV based, visits and links to other EV projects in partner countries will be contacted.

The EV fuel costs will be covered by payments made through B&SCTC to their drivers. A small amount of re-charging will be required for marketing which will be absorbed into the budget (it costs under 10% of an ICE vehicle to fuel).

The total cost of the project for the full 2 years will be around £77,000. The Clim-ATIC project will be providing up to £35,000 in staff time and project management costs, some travel costs, and vehicle purchase and conversion costs. Other funding has been secured from the Scottish government and other energy related organisations to meet the remaining costs – see attached budget sheet.

2. Relationship to Main Project

With a need to address our transport impact on the environment, remote rural communities and visitors face a challenge in changing their car-modal behaviour. Many communities and over 80% of visitors to the national park rely heavily on car use. Public transport infrastructure cannot serve all rural needs, and some form of personal transport is likely to be needed in the long-term.

The project provides a practical demonstration of possible behaviour change together with the use of new technology to help communities adapt to a changing climate, both economically, socially and environmentally.

It will help communities adapt to the challenges of Climate Change by:

Disruption	Project Adaptation Effect
Overall resources to construct new cars are reduced due to need to reduce manufacturing impacts	Pool use of the car will make best use of the car as a built resource
Spare parts difficult to produce, or deliver due to extreme weather	EVs need far fewer working parts – no ICE.
Prohibitive costs due to high fossil fuel prices	EVs run more efficiently than ICEs, saving energy
Disruption of fossil fuel deliveries , or electricity through the National Grid due to extreme weather	Power for the EV will be generated partially locally using the EVs turbine, mounted on a trailer
In extreme hot weather or during storm events, walking and cycling may be less attractive modal options	EVs provide a low-carbon cost alternative for shorter journeys

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Reliance on one form of fossil fuels will be dangerous in the future	EVs, running on electricity and renewables, will broaden our energy choices should one supply fail
Fossil fuel infrastructure may be damaged by extreme weather or civil unrest.	EVs are recharged at home or at work – no need for filling stations for shorter trips. Longer trips can be recharged anywhere there is a plug – cafes, shops, car-parks etc.
Not everywhere or everyone can access or use public transport for all, or every part of, their journeys	EVs provide a new form of personal transport to compliment buses and trains
With Climate Change pressures, all forms of energy use must become more efficient	EVs run at 65% efficiency, even allowing for National Grid distribution loss. ICEs run at around 15% even after 100 years of development

Providing real economic and social benefits to communities and visitors, the project is transferable to other areas within the NPP area. It will encourage greater use, and therefore lowering of the cost of EV materials such as batteries and recharging points, encouraging entrepreneurs and local businesses to get involved. This will help adapt the economy to job loss in petrol and diesel related industries, e.g. car mechanics, petrol stations etc.

The project will highlight the need for Climate Change adaptation within communities, and show what rural areas and their visitors can achieve to do their bit in reducing Climate Change.

The outputs will be to demonstrate a technology that have so far been restricted to urban use in a new area – that of rural Scotland. The project will report back continuously on the positive and negative outputs from the project, and measure public and visitor perceptions of its success and effect on modal-change.

The project will also measure saved CO2 from using the EV, and indirect savings from others moving from Internal Combustion Engine (ICE) use. This is likely to be over 20 tonnes based on 100,000 travelled km.

It will monitor the effectiveness of marketing the project with its on-car branding, visiting groups, and at Highland Games and Shows across the area.

It will establish the economic and broader social benefits of the EV, including fuel poverty and health benefits.

It will advise on the appropriateness of future EV projects in the area, e.g. for road freight and longer distance journeys.

The project will leave behind material on EVs to be available at local libraries, council and National Park offices to encourage EV take-up. Local schools will be supplied with material to undertake EV projects and studies.

The project will work with local academia to highlight the project and involve local University students in Park satellite cities.

Project Funding Partners

The funding partners are NPP Clim-ATIC itself, the Scottish Government Climate Challenge Fund, Highlands & Islands Community Energy Company, Aviemore & the Cairngorms Destination Mgt. Org., and for the publicly available recharge points, the Energy Savings Trust. Inverness College is keen to involve vehicle mechanic students in the project, and discussions are currently underway to look at ways the students can be involved in both the conversion process and the maintenance of the EV over the 2 years.

3. Project Management Structure

Clive Bowman – overall Clim-ATIC project coordinator, UHI

Clive.bowman@poerth.uhi.ac.uk (project overview)

John Thorne, Cairngorms National Park Authority,

johnthorne@cairngorms.co.uk 01479 870520 (project manager)

Badenoch & Strathspey Community Car Company, Maggie Lawson,

maggie.lawson@fsmail.net 01479 810004 (project administration)

Project funders

HITRANS, Randal Robertson, randal.robertson@hitrans.org.uk 01667460464 (co-funding)

EDF Energy, Mark Elliot, Innovation Project Manager (Elektromotive) Business Development (co-funding of recharge points)

Scottish Community Energy (formally Highlands & Islands Community Energy Co.) Boyd Henderson, boyd.henderson@virgin.net 01479 841859 (co-funder)

Project support group

All the above plus:

Scottish Government Sustainable Transport Unit, Kirsty Lewin

Kirsty.lewin@gsi.scotland.gov.uk 0131 244 7281

Aviemore & the Cairngorms Destination Management Organisation, Alan Rankin, CEO

alan.rankin@visitaviemore.com 07785 722936

Energy Savings Trust, Ian Murdoch, ian.murdoch@est.org.uk 0131 555 7902

The group will meet as required before the project commences, and quarterly thereafter via video-conference, telephone-conference, email or in person. A smaller sub-group of the project manager and administrator, supported by the UHI, will meet to monitor and give financial & practical support.

4. Project Activities and Deliverables

In July 2008 three EV suppliers/converters were asked to tender for the manufacture and supply of the EV. Unfortunately no tenders were submitted for the specification asked for. We have since returned to the tendered who was able to provide an EV closest to the specification required for the project, to negotiate the service, specification and cost. Following approval from the project steering group, the NPP and Perth College we aim to place an order with Dragon Electric Vehicles in mid November 2008. Estimated delivery will be January 2009.

Activity	Who	When	Cost	Cost to
Place order &	UHI/CNPA	November -	~£33,000	Clim-ATIC

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Deliver EV		January 09		project via Perth College
Order & delivery of alternative power sources	UHI/CNPA	November - January 09	~£6,000	Community Energy Scotland (was HICEC)
Maintenance of EV	B&SCTC/Inverness college	Ongoing	~£1,500 over project	Climate Challenge Fund (CCF)
Booking of EV	B&SCTC	Ongoing	Part of B&SCTC admin charge to project	CCF
Installation of public recharge points	CNPA (and B&SCTC where their volunteers involved)	Oct 08 – Dec 09	~£15,000 over 2 years	Energy Saving trust (EST)
Attendance at Shows	CNPA	Summer 09 & 10	~£500 each year	Clim-ATIC project/CCF
Evaluation of EV	B&SCTC	Ongoing & final report	~£125 per month for admin support. ~£1,500 for final report	Clim-ATIC project/CCF
		TOTAL	£77,000 *	

* See attached excel spread sheet for details of budget and funding sources

The project will:

- Demonstrate how an EV can be practical in a rural environment
- Reduce local fossil fuel use to adapt transport energy use to a new Climate Change scenario
- Commence mainstreaming EVs in the local area and beyond
- Demonstrate pool vehicle use (as opposed to private ownership of a vehicle) to make best use of rural dwellers' resources
- Demonstrate to visitors how EVs can mean more affordable, accessible and environmentally friendly travel on holiday
- Reduce the environmental impact of personal car ownership by car sharing a pool vehicle
- Reduce the cost of personal transport in rural areas and so transport poverty, where it is uneconomic to provide adequate public transport

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- Provide public recharge points for EVs
- Encourage more EV owners in the area, and to visit the area
- Educate visiting groups, academia, local communities and schools to EVs
- Be present and demonstrated at 6 Highland Shows and Games at least each year in 2009 and again in 2010
- Allow access to personal transport for excluded groups – the young, old, disabled people and those on low incomes whether resident or visitor
- Mainstream EVs and encourage ownership UK-wide, increasing economies of scale for manufacturers and driving down battery and conversion prices
- Demonstrating practicalities of rural EV ownership, and encouraging government to increase incentives for EVs, e.g. tax breaks on batteries and conversions.

The project will be marketed by branding the EV itself with logos, through press releases, and by visiting Highland Games and Shows, which many local people and visitors participate in. (part funded by Clim-ATIC and by the CCF)

Part of the project (funded outside Clim-ATIC) will also establish a network of public re-charge points, building up infrastructure for future EVs, local and visiting.

The project will provide a vital, Climate-Change friendly approach to fulfilling local transport needs for social and economic purposes.

At the end of the project, being a project asset the EV will have to go through an open sale procedure, funding partners will have the opportunity to buy-out the EV, and we hope the car will remain available for community use in the area if funding can be secured.

Links will be made with other NPP and EU projects where appropriate. The WP4 project in Are, Sweden is currently looking at sustainable transport options which may also involve the use of small pod electric cars. Resources are available to offer other projects the opportunity to visit the EV project both in-situ and at Games and Shows.

The project will be a success, and will be monitored by reference to the following targets and indicators:

- In place by early 2009
- km travelled (100,000km est.) and CO2 saved (20 tonnes est.)
- numbers using the car (residents and visitors)
- numbers viewing and testing the car at local Games and Shows
- numbers visiting the car in practice
- number of school children, higher academic institutions and schools involved in studying the project
- achieving 100%, or as near to, reliability
- use of renewable power (as % of total use)
- use of Green Tariff electricity (as % of total use)
- favourable reporting of the efficiency and performance of the EV (inclines, range, speed, comfort, noise)

- ease of recharging and basic maintenance
- successful buy-out of the EV for continued community use

The EV will help communities adapt to the effects of Climate Change by using alternatives to fossil fuel Internal Combustion Engines (ICEs). It may be powered initially by standard electricity, but this is three times more efficient than ICEs. Typically ICEs run at 15-18% efficiency, with macro-powered EVs at least 65% even after transmission losses of around 7%. It is intended to switch the main recharge points quickly to 'green' electricity (we hope by the start of the project). This demonstration project will also purchase (using non Clim-ATIC funds) PV cells or a wind turbine, placed on the car's trailer, to recharge the EV. This will reduce the carbon footprint for travel in the target area.

By demonstrating pool use of rural vehicles, the total number of vehicles owned will be reduced over time, as individuals will have access to personal transport, but only when required. This avoids a car sitting unused and makes best use of limited resources. It will also reduce the number of visiting cars. Reduction in the use of resources such as steel and plastics used for car manufacture will bring positive adaptation results.

The EV will use locally produced electricity, meaning a lesser reliance on grid power, or the importation of fossil fuels, both of which are under threat due to Climate Change.

By using locally produced power, the EV will reduce the loss of power through transmission, and the need to construct more electrical grid infrastructure as EVs replace ICEs.

5. Project Reporting

The WP4 leader (Ian Kelly) and the lead partner in Scotland (Clive Bowman) will both visit the project periodically during its implementation to see the EV in action, and written reports will be given to the WP 4 leader on a regular basis.

A final visit will be made in early 2011 to review the project and oversee the sale of the vehicle.

A final report on the performance, marketing and use of the EV will be made available and reviewed.

We aim to make short media clips of the EV in use, and interviews with users for educational and project marketing purposes, that will be broadcast via the project website or perhaps a DVD. This will include sort interviews of the drivers and users of the EV, which will also be available on the project website.

6. Dissemination

Presentations and demonstrations can be made at regional seminars and possibly at the final project conference (depending on location). Full and final dissemination of the results will take place via the final report. This will allow transferability to other rural areas in the NPP region. The final report will be made widely available.

7. Links to other projects

We are aware of no other rural EV demonstration projects in Scotland, or other NPP partner countries. Further investigation will take place to identify both other car sharing and sustainable fuelled vehicle projects and visits will be actively encouraged to this project from abroad, and we will visit similar schemes in Europe. The project is transferable to any other rural area, and we will seek to encourage areas that have not yet looked at EV use to visit us and examine the positive aspects, and limitations, as we discover them. The objective will be to kick-start other rural EV projects during the remaining 2 year period and disseminate a wide range of material and results to potential EV groups.

8. Project Finance

The car will either be a nearly new 5 door Vauxhall Astra, approx. purchase cost of £5,000 with conversion cost of approximately £25,000 by Dragon Electric Vehicles Ltd.

See attached excel spread sheet for details of budget and funding sources

9. Summary Project Programme

Date	Action
March to June 08	Project planning
June – August 08	Initial tender to identify potential costs
Sept – Oct 08	Negotiation with tenderer on specification and seeking additional budget
November - December 08	Place order and EV conversion
January 2009	Delivery of EV & Launch of EV project
Summer 09/10	Marketing of EV at Games and Shows
November 2010	Start of Final review and report.
Feb2011	Termination of project and EV sale. Final review published.