

BUILDING BACK GREENER

Ideas, information and stories on Udney's Road to Climate Positive

CLIMATE CAFÉ

Online Event

Repeated on each of the following dates:

29th May at 10.00 am

3rd June at 7.30 pm

8th June at 2.00 pm

Our Future Homes

- Energy efficiency in our homes
- Changes to our homes
- Grants & loans for energy efficiency, low carbon heating systems and transport

Tell us what you think

See Page 2 for further information and how to register for the online event.

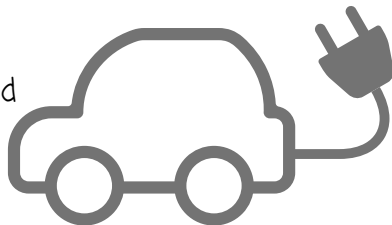
CLIMATE CAFÉ



The road to zero carbon means that how we heat our homes, drive our cars and control our energy use will change.

Explore what all this will mean for us with **Community Energy Scotland** AND tell us what you think.

- Energy efficiency in our homes
- Changes to our homes
- Low carbon heating systems and transport
- What is a 'smart home'?
- Grants & loans for energy efficiency low carbon heating systems and transport



Free to join but, sadly, we can't supply the coffee! Register for the Climate Café on just **ONE** of the following dates:

Saturday 29th May at 10.00 am

Thursday 3rd June at 7.30 pm

Tuesday 8th June at 2.00 pm



Email: climate_action_admin@udny.org

Scan QR Code to Register

Register at <https://www.eventbrite.co.uk/o/udny-climate-action-33063724209>

or Udney Climate Action www.facebook.com/UdneyClimateAction/

An Introduction from
Mark Stephen
Presenter of "Out of Doors",
BBC Radio Scotland



There's an old saying in journalism that "All News is Local". The same is probably also true of Climate Action. The problems facing us might be global but the solutions to those problems will ultimately be local ones.

I've heard people saying things like "What's the point of me changing my light bulbs or eating less meat when China is still building massive coal-fired power stations or the Brazilians are destroying their rain forests?" It's a good question but it somewhat misses the point.

Obviously we can't offset the harm that the rest of the world is doing but we

can reduce the harm that we do. It won't all happen at once but if everyone did that, everywhere, we could tackle what is undoubtedly the biggest existential threat to our planet.

And, here's the thing, all of those actions, wherever they take place, large or small, national or individual, will be "local" ones.

We all just need to do our bit and all credit to the good folk of Udney for doing just that.

This booklet is also available online at <http://climateaction.udny.org> which may help with accessing the web links

What are those wee boxes?

They are QR codes, and are there to save you typing ridiculously long addresses in your web browser.

If you use an iPhone just point the camera at it.

An Android phone will need an app like the one by Avira.. (just search for Avira QR scanner)



A Challenge for us all

Few now doubt that the world faces a very serious issue caused, to a significant degree, by the way we live. The issue is no longer is a question of whether there is a problem but rather how best we should deal with it. The solutions, and most climate scientists agree that there are solutions whatever the pessimists say, lie at every level- international, national, local communities and individuals. The threats we face will be greatly reduced if we all play our part.

Action at the individual and community level can only take us so far, structural changes at national level are essential, but that 'so far' is critical. We can reduce our own greenhouse gas emissions and put pressure on companies through what we buy. The political classes have, on the whole, been slow to act but, in a democracy, act they will if we make it clear to them what we want.

Change is always daunting but trying new ways of doing things can be fun too. Some things we can do are easy wins, others are more challenging; for some issues, the best way forward is not yet clear. As society alters direction, it is essential that fuel poverty, a real problem in Scotland, doesn't increase and those employed in industries will which have to change are not left behind: the transition must be a just one.

Udny Climate Action is working to build on what the Parish has achieved so far. For a number of years the turbine has been pouring green electricity into the grid. Linked to the energy efficiency upgrade of the Udny Green Hall in 2015, events were held and household energy advice was provided. PUT and the Paths Group have planted trees. A

number of houses and buildings have benefited from insulation retrofitting and most of us have plucked the low hanging fruit of low energy lighting, improved roof space insulation and upping our recycling efforts. In ten years time how and when we will travel and how we heat our homes will be very different; we need to begin these transitions now.

This booklet doesn't claim to provide the answers but by drawing together a wide range of issues through factual pieces, personal stories and a ragbag of ideas, we hope it will tentatively map out how the Parish might reach zero carbon. We hope it both sparks your interest and entertains.

George Allan (Udny Climate Action)
Paul Bailey (Udny Community Council)

Thanks

Udny Climate Action would like to thank-

- Community Energy Scotland for its financial support and staff time without which this booklet would not have been published and the online sessions could not be run.
- Udny Community Council for its support.
- Everyone who has contributed to this booklet by writing articles, providing photos or drawing cartoons. Unattributed articles have been written by Udny Climate Action

Disclaimers

Udny Climate Action does not endorse any specific products, companies or organisations. Where these are mentioned, it is to highlight options for readers to consider.

Udny Climate Action has made every effort to ensure that the information in this booklet is correct but advises readers to undertake their own research before undertaking carbon reduction initiatives, particularly those involving financial outlay.

trees: yes, please but--!

Politicians just love promising us more trees. We can all get a fuzzy glow when a government minister stands up and states that so many million will be planted to solve the climate crisis. Of course trees have a big part to play. They can store large amounts of carbon for a long time if left in place or felled and the timber used for house construction or furniture.

Trees can bring many other benefits. Woodland is home to numerous species, and so helps to promote biodiversity; woods are a delight to walk through and forestry provides long term employment opportunities. Respondents in the Parish to Udny Climate Action's consultation saw increased tree cover as a priority, and rightly so. What's not to like?



The issue isn't trees, it's what we plant, where we plant them and what we can expect from them. If planted in line with the best scientific advice, they will draw very large amounts of CO2 out of the atmosphere but we can't expect them to do that quickly.

Time is of the essence so relying on trees as a get of of jail card is not a wise course of action. Tree planting needs to be seen as complementing other initiatives which have more immediate effects on global warming, not as a substitute for them.

As with assessing the climate benefits of different types of food and ways of producing it, evaluating where best to plant what trees is complex. Planting in organic soils, particularly peat, risks increasing CO2 emissions. Well tended pasture land can hold large amounts of CO2 and continuing to maintain it in good condition can be of greater benefit than changing it to forest. Ensuring existing forests are well cared for can be as effective as the creation of new ones.

Having raised the importance of getting things right, the advantages of increased tree cover in the Parish are obvious. To achieve this, there is a need to go beyond small scale, opportunist planting and to develop a parish-wide plan for wooded wildlife corridors and larger scale planting. The idea of a community woodland has long been mooted too.

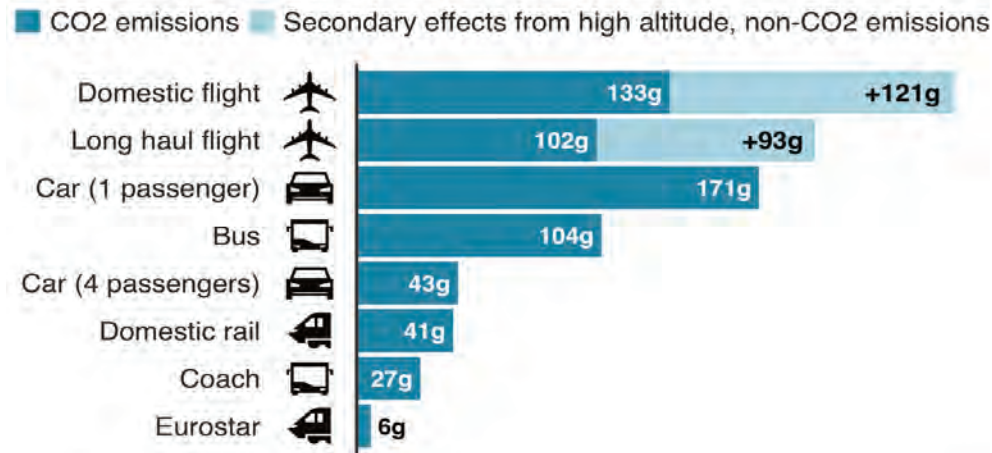
This level of ambition will require the involvement of various statutory bodies and local land owners, a task beyond Udny Climate Action on its own. However, we hope to be party to getting things going and, in the meantime, we will continue to look for opportunities for smaller scale planting.

Travel- a big one

At 27%, transport accounts for one of the largest greenhouse gas emitting sectors in the UK. It is also associated with pollution with serious public health implications. The table below shows not only just how big greenhouse gas emissions are but how they vary radically between different forms of transport. Missing from the table are the negligible emitters- cycling, walking and wheeling.

Emissions from different modes of transport

Emissions per passenger per km travelled



Note: Car refers to average diesel car

Source: BEIS/Defra Greenhouse Gas Conversion Factors 2019

BBC

People living in rural areas with limited public transport, like Udney, and with employment opportunities spread over a wide area, have challenges which are different from people living in cities. So what does the future hold?

The national response

The Scottish Government has committed to:

1. phasing out sales of new petrol and diesel cars and vans by 2030.
2. reducing car kilometres by 20% by 2032
3. introducing low emission ferries.
4. further electrifying the rail network
5. creating low emission zones in cities.

What changes might we make at the local level?

• **Travel less.** Even with the electrification of transport, large amounts of energy is consumed by building vehicles. The restrictions imposed on us by the pandemic have had one positive benefit, they have

shown us that there are ways of working which involve less travel and that there is much to enjoy in our neighbourhoods without travelling far.

• **Car sharing.** While obviously a non-starter in the current situation, car share has largely untapped potential both for one-off trips and for commuting. Aberdeenshire Council funds a scheme www.aberdeenshire.gov.uk/roads-and-travel/transportation/commuting/car-share-scheme/ (**Scan the coloured QR code for the link →**)

• **Car clubs and e-bike hire.** The development of such initiatives has the potential to reduce the use of personal transport. Huntly Development Trust already runs schemes.

• The move to **electric vehicles.** The growth of charging networks and forthcoming improvements in battery technology, leading to speedier charging and greater range, will stimulate the move away from the internal combustion engine.

• **Flying.** What can we do with the elephant in the room? A quarter of the UK say that they never fly and a large proportion of all flights are taken by a small percentage of people. The majority of people who do fly do so to go on holiday. The number of flights has grown over the past decade and, prior to the pandemic, was predicted to go on increasing.

The aviation industry's solutions are three fold-

- a) increasing use of lower emitting fuels
- b) the longer term hope of developing electric planes, at least for short haul flights
- c) offsetting.

In the medium term, these won't make much difference.

To meet climate targets, business as usual cannot go on. Should we stop flying or are there ways we can still travel abroad while reducing the consequences, particularly as some developing countries are heavily dependent on tourist income?

Ed Douglas, mountaineer and author, who has travelled extensively in Nepal, makes the point that, without the trekking industry, many Nepalese would go to work on industrial sites elsewhere in the world. And how would they get there?- fly of course! He argues that it's better that tourists fly to Nepal and sustain work there than Nepalese fly to work in poorly regulated industries in other countries.



Electric vehicles have come a long way since this early Tesla prototype

Maybe there are solutions to the 'holiday dilemma'. We can travel by other means other than by air, if that is feasible, or go less often but for longer. A three week holiday every two years, rather than a couple of short breaks every year, would both reduce our carbon footprints and sustain much needed employment in places which are largely dependent on tourism.

And what should definitely be off the menu?- Flying off to stag weekends in Prague!



Zoe seduced my husband Tamsin Morris

My husband is very involved with Zoe. He spends hours checking his phone for messages from her. Apparently, she's particularly chatty on a sunny day.

I guess if Zoe wasn't a car, I might feel threatened. But I think I'm resigned to the fact that she's more interesting than me. Zoe isn't just any car you see; she's a shiny electric car with a 44kwh battery. We bought her back in 2019, so we've spent the last 18 months adjusting to life in the electric lane. Of course, Covid has meant that it probably hasn't been a completely fair trial – the scope for long road trips has been limited recently, but we've still learnt a lot.

A Renault Zoe looks very similar to a Renault Clio, so it's not a huge car. You can just about fit two people, two dogs and all their stuff for a weekend away, but a family of five would probably struggle to pack for a holiday. The battery range is around 140 miles in the midst of winter, and goes up to around 170 on a nice warm sunny day (the battery has to work harder when it's cold). It takes 2 – 3 hours to charge the battery on a 22kw charger (the type you see in Aberdeenshire Council car parks, which now charge about 20p / unit), or about 5 hours on our home charger, which only produces 7kw at full whack.

We're on a slightly cheaper electricity tariff with Ecotricity because we have an electric car, so a full charge of 44kw costs about £7 (which works out around 5p per mile, in contrast to around 10-11p per mile for diesel in a reasonably fuel efficient small estate car and 16p per mile for a larger, less fuel efficient 4WD). We chose Ecotricity because they only supply electricity from renewable sources, so we know that the car isn't being powered by carbon indirectly through the burning of coal to make electricity for the grid.

However, we also have solar panels on our



house, so when the sun is shining, we can charge directly from them, meaning all those miles are free. Of course, you can't rely on getting a day of full sun just when you need to charge the car, so we're not in the realm of cost-free motoring yet, but last summer we managed to drive almost entirely on Aberdeenshire solar electricity.

We've found that a long journey takes a bit more planning when it's electric. After about 2 hours of driving, you'll need to find somewhere to plug in. If you're cunning, you find a charging point near a nice cafe (remember those days?) and then you can have a coffee and go for a dog walk while you wait. For us it works well, as the two dogs are usually fully charged and raring to get out, just as the car heads towards fully discharged.

We still have a diesel powered camper van, so if we suddenly needed to travel 400 miles without stopping, we could do that. But so far, that need hasn't arisen and with a bit of planning, Zoe generally works out fine. For trips to Aberdeen, Inverurie or Ellon, it's exactly the same as using an ordinary car. If I'm going to Stonehaven or Elgin, I need to remember to charge it up the night before. And for further afield, like Ullapool or Edinburgh, I need to do a cafe and charging point search before I go.

As a vehicle, it's easy and quiet to drive. It's automatic and with all climate tyres we found it fine in the recent snow and ice. It wasn't a cheap initial purchase (although we bought it second hand, which helped) and running costs are then lower than diesel. Plus you get to drive with the knowledge that you're doing as much as you can to cut down your carbon footprint, especially if your energy supplier uses renewables. And apparently that's why 'him indoors' spends so much time on his phone, checking up on Zoe and her charging app. It's not because I'm dull. Obviously.

Offsetting- what's it all about?

Many readers will know about offsetting, some may have heard about the controversies surrounding the idea. Offsetting involves a household or a company measuring its carbon footprint, taking action to reduce this and then sending funds to projects which prevent or remove CO2 from the atmosphere to compensate for the amount still being emitted: a great idea at first sight. Dedicated companies can arrange offsetting through peatland restoration in Scotland or tree planting at home or abroad. There are schemes to provide clean burning stoves and develop wind and solar projects in developing countries.

Problems
Difficulties can occur, however, in two ways. Firstly, the process can become an excuse for not reducing the greenhouse gases being emitted- a 'let's buy our way out of the problem' approach. For example, a company might trumpet its carbon offsetting activities in its annual report while scrutiny of its 'business as normal practices' show that it has made little attempt to reduce its carbon use. We simply have to make deep cuts into the amount of greenhouse gases we pump into the air; offsetting is no alternative to this. A further criticism has been that some schemes have been poorly run and the money donated has been wasted.

--but solutions too
Do these concerns mean that individuals and households shouldn't consider offsetting? No, it doesn't. The watch words are, firstly, take steps to cut our green house gas emissions and, secondly, investigate

before sending offsetting money. There are companies which are reckoned to be reliable. These provide carbon calculators on their websites which estimate what you should send.

One such is The Gold Standard, founded by The World Wide Fund for Nature, which certifies offsetting projects as being effective:

<https://goldstandard.org>

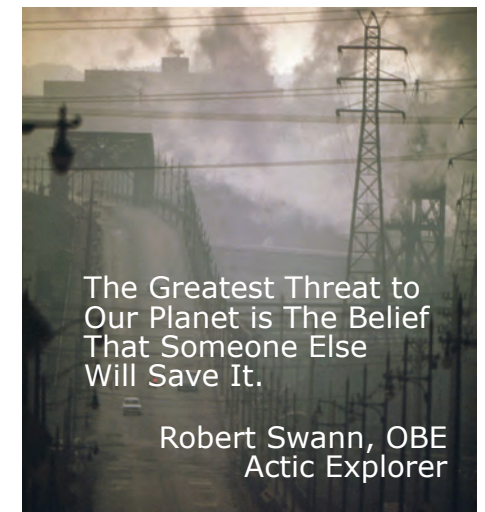


If you are keen, you can adopt a do it yourself approach- use a calculator to measure your annual emissions, take steps to reduce them, work out a sum

to cover what's left and then send this to a project such as The Woodland Trust or Tree Aid, whose work involves carbon sequestration.

This is an article worth reading on offsetting:

<https://www.theguardian.com/travel/2019/aug/02/offsetting-carbon-emissions-how-to-travel-options>



The Greatest Threat to Our Planet is The Belief That Someone Else Will Save It.

Robert Swann, OBE
Arctic Explorer

Udny Community Trust;- Supporting Environmental Projects

Yvonne McLeod (Development Officer-UCTC)

Udny Community Trust Company (UCTC) is a charitable company which exists to help the community of Udny to develop.

We earn income for community projects and groups through the profit generated by a subsidiary the 'Udny Community Wind Turbine Company'. You can find out more about the journey towards the building of the turbine and the creation of the Wind Turbine Company elsewhere in this booklet.

Since UCTC came into existence in 2011, we have overseen the distribution of almost half a million pounds worth of grant funding. This all went to local groups, charities and good causes. £142,774 worth of those grants were awarded to projects with a strong environmental theme.

- Udny Green School received several grants which allowed them to create an outdoor classroom and a poly tunnel. Children use them to learn about nature and about growing their own food.
- Pitmedden, Udny, Tarves SCIO and the Allathan residents group both used grants to fund local flower planting projects. These colourful displays have been welcomed by residents and visitors alike. Bees and other insects also seemed to enjoy the display, which is always nice to see.
- The River Ythan Trust received funding which allowed them to clear debris from local tributaries of the Ythan and to carry out educational sessions with local schools
- By far the biggest budget commitment has been to the three Village Halls, at Pitmedden, Udny Green and Udny Station. All three halls received substantial grant funding. This allowed hall committees to bring them up to a much more energy efficient and comfortable modern standard
- Udny Climate Action itself received funding for a series of Fuel-Efficient Driving lessons for residents. We remain fully supportive of the work being done by Udny Climate Action and are watching the development of the group with interest.

The Board of UCTC has been pleased to assist in funding many local projects over the last ten years, but this last year has seen a very big change in emphasis. As well as continuing with the grant scheme, the Trust has been working very hard on a new project of our own. A community consultation in 2018 resulted in a report titled 'Imagine Udny'. In it, the community made clear that they supported UCTC to find a property suitable for use as a community hub and which could offer a community café. An ideal property came on the market in the form of the Linsmohr Hotel in 2019 and following a successful funding application and lengthy negotiations, UCTC took ownership in March 2020.

The purchase of the building has brought many challenges. We have made good progress but are very aware that we are just scratching the surface of all the work that will be needed to bring the building into the 21st century. We commissioned an energy report from Zero Waste Scotland which has provided us with options for improving the efficiency of the building. We are currently working our way through

the recommendations. A new heating system and radical improvements to the insulation of the building are high on the priority list. These things are going to take planning, time and substantial funding to complete. We have begun with the easiest recommendation, which was to change the lightbulbs for energy efficient versions.

We recently chose the renewable electricity provider 'Smartest Energy' to supply our electricity needs. Coincidentally, 'Smartest Energy' purchases the power generated by our wind turbine, so we could legitimately claim that we generate our own electricity.

The newly opened Cafe48 is in our new building and is part of the Community Trust family. The Cafe incorporated several suggestions made by Udny Climate Action into its daily operation and we are grateful for the information and advice given. As the project progresses, we will always welcome practical suggestions to help us achieve the best environmental practice possible.

If you would like to hear more about the work done by Udny Community Trust or if you would like to get in touch, you can find us here-
<https://udnycommunitytrust.org.uk/>

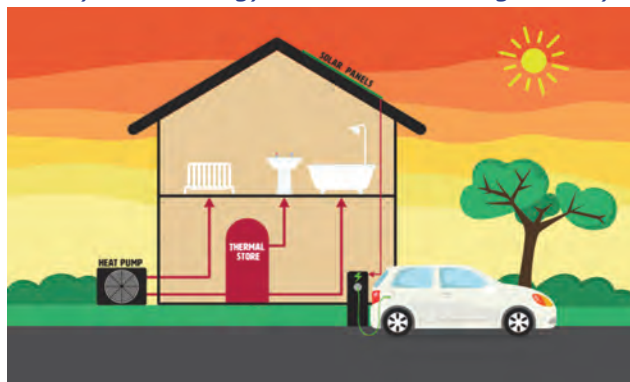


The Future: heating our homes, driving our cars Victoria Mackay (Community Energy Scotland)

The nation's carbon footprint is largely determined by the buildings we live and work in as well as the way we move around our cities, towns and villages whether via car, bus, train or bike. To combat climate change, the Scottish Government has set ambitious targets to achieve net zero carbon emissions by 2045 and significant action across the transport and buildings sectors will be key to meeting these. To achieve its goal of zero emissions buildings, the Scottish Government is planning for at least one hundred thousand homes to be converted to low or zero carbon heating systems each year by 2030 - a daunting but achievable target if properly resourced.

Of Scotland's buildings, residential properties are the largest carbon emitters accounting for 73% of total emissions with 87% of their energy used for heating. This means that the way we build our homes and the way we use energy in our homes will significantly change over the next 30 years.

So what will an average home look like in 2050? Well, all residential buildings will be more energy efficient. This means that not only will buildings lose less heat due to improved insulation and draught proofing, but we will also be using less electrical and heat energy to perform the same everyday tasks.



All buildings will have a 'smart meter' – a device that measures electricity consumption in real-time and transmits data directly to your energy supplier removing the need for manual meter readings and estimated bills. These meters will have a screen which displays how much electricity we are using in real time in both kilowatt hours and in pounds and pence. Many appliances in our homes will also be 'smart' which means they will be controlled and monitored remotely and programmed to perform specific tasks at certain times. Some of us already have appliances which are semi-smart e.g. most heating systems include a basic timer which allows us to set when the heat comes on and for how long. In 2050, many of us will have heating systems with smart thermostats which will be programmed to switch on and off when the outside temperature reaches a predetermined point.

Most buildings today in Udnby are heated by oil, LPG boilers or electric storage heaters but in 2050 these will likely be replaced by heat pumps. Heat pumps do not generate heat—they transfer heat from a source, e.g. air, water or the ground, using electricity. Heat pumps can be used to provide heating and hot water to your home just like a traditional boiler.

Most buildings in towns and cities are connected to the gas grid and many of these will also need to convert to heat pumps. However, the Scottish Government's long term plan is to replace the natural gas in our mains gas network with 'green' gases such as biomethane and hydrogen, so not all buildings will be served by heat pumps.

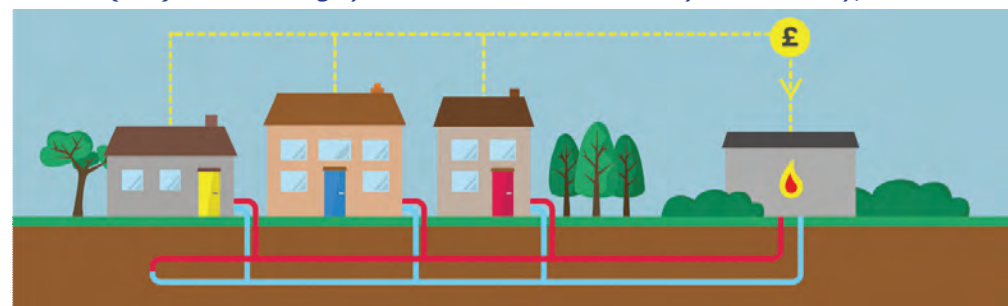
Unlike rural areas where the population density is low, many urban buildings with heat pumps will be connected to a heat network. These are networks of pipes which carry heat in the form of hot water to multiple buildings from a central energy centre. The energy

centre could use heat from a single source or multiple sources such as heat from the ground, water, waste and biomass. Rather than having a boiler, connected buildings will have a Heat Interface Unit (HIU) which is similar in size to a small domestic gas boiler. The HIU extracts heat from the hot water in the network pipes and transfers it to the individual central heating and hot water system of the connected buildings.

The increasing uptake of electrical heating and hot water will also encourage the coupling of solar panels with our heating systems. Many buildings, particularly those with south or south east facing roofs, will have solar panels which will generate electricity when the sun is shining for immediate use or to be stored within the building itself in batteries. This electricity will be used to power not only lights and appliances but also the heat pumps which heat our homes.

We will increasingly see homes that power down when the front door is locked as well as movement based lighting systems. Non-essential equipment will power down or off completely when electricity prices are high and will draw from the grid when prices are low, topping up any storage systems, including electric vehicles, at a reduced cost and helping to keep energy bills down.

The Scottish Government has committed to banning the sale of new petrol or diesel fuelled vehicles from 2030, so by 2050, the transition from petrol/diesel to electric vehicles (EVs) will have largely been made. EVs run entirely on electricity, with no



petrol or diesel engine but an electric motor powered by an internal battery. The battery will be charged from either a standard electric socket or a special electric vehicle charge point charged from electricity obtained directly from the grid or from electricity generated by domestic solar panels.

For those who own EVs, some homes with access to a private parking space will have dedicated induction or cabled vehicle charging points provided as a matter of course, while those living in flats will have access to an extensive public EV charging network. Even today there are more public chargers in the UK than there are petrol stations and this number will increase substantially by 2050. For many others, private vehicle ownership will be forfeited in favour of ride sharing and the growth of car clubs where members can rent vehicles for use as and when required.

Decarbonising Scotland's buildings by 2045 is a huge challenge and progress thus far has not been smooth sailing, however there are clear opportunities in the coming years to raise the quality of our building stock and help tackle fuel poverty by reducing future energy costs for everyone.

Pablo, my e-bike, cuts my car mileage

Dave Horsley



What is an e-bike? Details of the regulations can be found here:

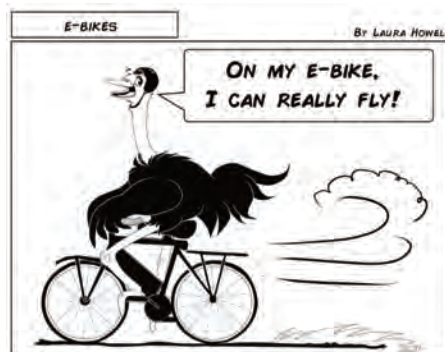
<https://www.gov.uk/electric-bike-rules>

You need to be over 14 to ride one, it must have pedals that can propel it and the motor must have a max output of 250 watts. Power should cut out at speeds over 15.5mph and it should only work if you are pedalling (an e-bike with a throttle needs type approval).

If it doesn't meet these regulations then it is defined as a moped or motorbike and requires to be registered and taxed. You then need a licence to ride it and must wear a motorcycle helmet.

That's the legals out of the way. So why did I buy an e-bike? Well I'd started to ride to work (from Udný to Foresterhill) a few years ago, but as I got older I found I was cycling less and less and taking the car more often, particularly if the weather was looking at all bad. So I decided to buy my first e-bike in the hope it would spur me to cycle commute more. I bought myself a Whyte Clifton (which I christened Sparky) from Edinburgh Bicycle Cooperative. It was an ex demonstrator model with 500 miles on the clock and was reduced from £2200 to £1500. When I bought a brand new shiny E-bike last year, I lent Sparky to a friend so she could get out cycling during lockdown.

I used it for commuting and for visiting friends (*an activity which was practised by humans in the years BC - Before Covid*). I used Sparky for 3 years and did around 2200 miles on him in that time. I found that as road conditions were getting worse I was getting a lot more punctures so in January last year bought a new mountain e-bike from Alpine bikes - a Cube Reaction EXC (I called this one Pablo). I picked him up in February, just before lockdown. I didn't use him much during lockdown/furlough as I did all my exercise on a normal bike, but after I was back at work in July I aimed to try and cycle much more frequently to work and to use Pablo for all my short journeys where I didn't need to transport large quantities of stuff. In the year I've had Pablo I've done 3447 miles, of which 2940 were commuting.



Both my e-bikes have the motor in the bottom bracket which provides assistance directly to the pedals. There are also versions where the motor is in a wheel, but I've not tried one of those so can't comment. Most bikes have 3 or 4 different assistance levels (plus no assistance). The assistance feels great when it kicks in, it makes it very easy to pedal and feels as if someone is giving you a push, especially in the higher power modes. Initially I used one of the medium power modes and stayed in quite a high gear. This was fine on the flat or on hills where you were below the cut off speed, but I found that when I got the bike above the 15.5mph power cut off it would suddenly go from easy pedalling to pedalling through treacle as the power cut in and out. It was very disconcerting. I now use the gears much more, just as you would on a normal bike and tend to use the lowest level of power assist. That means the power is provided much more smoothly and you don't get the "cycling through treacle" effect. I use higher assist modes in exceptional circumstances such as strong headwinds, steep hills, and bad weather, when I want to get home as fast as possible.



Pablo has a 625 Ah battery which for commuting from Udný to Foresterhill in the lowest assist setting gives about 90 miles range (3 commutes). The range is much less if you use higher power. The distance you can travel is given on the bike's computer. It can be a bit disconcerting, as it uses an algorithm to compute the range available from

your recent power usage. This means that fully charged at home I'm told I have a range of around 130 miles. At the top of the hill down to Newmachar station, having cycled less than 5 miles, the range is down to 80 miles. Then, after a few miles of mostly downhill or flat riding it goes back up to around 115 miles at the Haudagain roundabout. You get used to how the range given on the computer varies with recent terrain with experience and, unlike an electric car, if you *do* run out of power it's still a bike, so you can just pedal it home.

So, to summarise, I use my e-bike for commuting and getting from A to B and a normal bike for exercise and recreational cycling. The big advantage for me of the e-bike is I don't use the weather as an excuse not to cycle commute as I can always turn up the assist to get home.

Udny Climate Action – our action plan

Introduction

1. The purpose of the action plan is to develop and to support initiatives to combat climate change and to reduce its harmful effects on the environment.
2. The plan will cover a five year period 2021 to 2026. It will be subject to annual review and updating.
3. The plan has been informed and shaped by a consultation with the residents of Udny which took place in the autumn of 2020 and by the Scottish Government's update of its Climate Action Plan (Securing a Green Recovery on a Path to Net Zero: Climate Change Plan 2018–2032 – update).
4. Position statements and specific plans will be developed for key issues.
5. The target dates and outcomes are provisional and will be updated as specific plans for individual actions are developed.

Priority Actions

Tree cover; Udny Climate Action will;

- plant the 400 trees donated by the Woodland Trust under its 'free trees for schools and communities' scheme adjacent to paths in the Parish.
Timescale: March 2021
Outcome: carbon sequestration over the long term.
- work with the Community Council and others to develop and implement a plan to increase tree cover in the Parish in line with best practice regarding sequestration. This will include forestry for biomass and other issues regarding land use, including the possibility of increasing wetland. Composting and anaerobic digestion will also be supported.
Timescale: Development of plan by December 2021. Implementation from 2022.
Outcome: carbon sequestration over the long term.

Zero waste Udny Climate Action will:

- over time, implement all the actions in the ZeroWaste Position Statement (refuse; reduce; reuse, recycle; rot).
- implement phase one of the zero waste position statement.
Timescale: December 2021
Outcome: phase one actions implemented (swap shop; drop off point for hard to recycle items; engagement with schools and community groups on zero waste; local guide for achieving zero waste)
- plan the implementation of the second and third phases of the Zero Waste Position Statement.
Timescale: January 2022

Outcome: develop a plan to implement the second and third phases.

Product miles Udny Climate Action will:

- promote purchasing of locally produced goods (particularly food) for the purpose of reducing 'product miles'.
- produce and promote an updateable directory.

Timescale: October 2021

Outcome: improved knowledge throughout the Parish of outlets where locally produced goods (particularly food) are available.

Zero Carbon Udny: Udny Climate Action will:

- work with the Community Council and other organisations and local groups to explore the feasibility of working towards 'Zero Carbon Udny' by a particular date and develop a plan for how to achieve this. The plan will focus particularly on domestic heating, transport and increasing the use of domestically produced green energy.
Timescale: November 2021
Outcome: production of a blue print for how to achieve Zero Carbon Udny.

Additional Actions

Community Engagement Udny Climate Action will:

- increase its engagement with the community in order to ascertain the views of the people in the Parish and to provide up to date information regarding the climate crisis and ways by which it can be addressed.
- develop further methods of communication (electronic, in-person and hard copy) in order to facilitate engagement with the community.
Timescale: ongoing from January 2021
Outcome: improved communication with people in the Parish

Transport Udny Climate Action will:

- develop a plan to support reducing the need to travel and, where this is essential, lessening its impact. This will include a reduction in car use by addressing public transport issues, increasing opportunities for walking and cycling and encouraging car sharing
Timescale: December 2021
Outcome: plan finalised and ready to implement

Future family (low carbon family living): Udny Climate Action will:

- in junction with work on Zero Carbon Udny, consider the possibility of a 'one tonne challenge' pilot with a small number of households aimed at supporting them to further reduce greenhouse gas emissions.
if the pilot proves successful, consider rolling this out further.
Timescale: October 2021
Outcome: if the model proves to be feasible, initiate the pilot.

Local energy generation projects Udny Climate Action will:

- engage with interested parties regarding the feasibility of increasing green energy generation within the parish both at domestic level, as part of Zero Carbon Udny, and at larger scale.
Timescale: ongoing
Outcome: reduction in carbon use and increased opportunities for offsetting.

Political activities Udny Climate Action will:

- campaign for, or support, support policy changes at Council, Holyrood and Westminster levels to reduce greenhouse gases.
Timescale: ongoing
Outcome: influencing policy.



Photo taken on
The Udney Castle Walk

Red squirrels Owen Cartledge (age 11)

Did you know that there are red squirrels living here in Udney?

It is so important that we preserve their habitat to keep them here because they are now an endangered species due to the loss of some woodlands.

Red squirrels are really helpful because they help our trees by taking seeds, (which are the main source of their food) then bury them.

They bury them throughout the environment to save for later and often when they go back and look for them they forget where they are so when that happens they are effectively planting trees!

Udney climate action recently planted lots of trees around the Fisher walk and I helped plant a few of them. It will be good to see them grow and when I am older, I can go back and look at them. These will be good for the red squirrels in a few year's time.

Here are some fun facts about red squirrels.

1. Red squirrels are not always red, sometimes they can be black, brown or even white in colour
2. Baby red squirrels are called kittens
3. Red squirrels can swim and hang upside down!
4. They can live to 6 years of age
5. The best times to spot them the red squirrels are in the morning or late afternoon
6. Red Squirrels don't hibernate, in winter they rely on food that they have previously buried and they can find their food supplies in over 1 foot of snow!

TerraCycle- how to recycle the 'hard to recycle' Laura Jackson

With recent media coverage of the Swedish schoolgirl Greta Thunberg and Sir David Attenborough's documentaries we are all trying our best to be more environmentally friendly but it can be difficult. Knowing what choices to make to reduce our landfill and at the same time reduce our carbon footprints can be confusing.



Well, have you heard of the company TerraCycle?

TerraCycle was founded in 2001 by Tom Szaky, then a student at Princeton University, on a mission towards Eliminating the Idea of Waste®. From these humble beginnings TerraCycle has grown into the global leader in collecting and repurposing hard-to-recycle waste: operating in over 20 countries, engaging over 60 million people, and recycling billions of pieces of waste through various innovative platforms.

TerraCycle can recycle almost anything and they have teamed up with a variety of big companies to offer free recycling programs. There are lots of schemes on offer through many different drop off points though some may currently be closed due to covid restrictions. Some of the local ones are:

Ellon Academy for plastic packaging of crisps, nuts, pretzels, popcorn, biscuits, crackers, cakes, sweets, chocolate.

Tarves primary school for plastic pens and pencils including tipex pens and rollers.

Tarves Pharmacy for empty medicine blister packets.

Schoolhouse, Barthol Chapel for crisp bags, popcorn bags, sweet/chocolate packaging, flexible plastic packaging for pet food/treats including wet food pouches, cheese packaging, all oral products such as toothpaste tubes and brushes. For drop off arrangements email- lindseytaylor13@icloud.com

For recycling, packages should be empty of produce and relatively clean.

There are lots of other recycling programs, check out the website for more details:

<https://www.terracycle.com/en-GB/collection-programs>.



Scroll down for the free schemes or consider purchasing one of the other available recycling boxes. The organisations that are registered as public drop off locations actually earn money back that they can donate to a charity or a school. So that's less landfill and more money for good causes. To date, over 202 million people are collecting in 21 countries and have collected billions of pieces of waste, raising over 44 million dollars for charities around the world.

Laura Jackson collects most of the above locally. For drop off arrangements, email her -

laurajackson050610@gmail.com



Home energy- getting to zero carbon

Steve Baguley

The fantasy future for home energy is that we will all live in cosy homes with lashings of hot water, using all the gadgets and appliances we want, all without any CO₂ being released in the process.

Getting to zero carbon without offsetting (e.g. planting trees somewhere to compensate for our pollution) is not realistic in Scotland in 2021, but how low can we go? The easiest way to get close to this is to build an airtight, superinsulated structure containing multiple homes heated and powered entirely using renewable energy. But this is ahead of current building regulations and most people don't live in new houses anyway.

So how feasible is it to get close to zero carbon by retrofitting insulation and renewable technology into an old house?

Our story

In late 2009 we moved into a draughty and poorly insulated oil-heated steading conversion with 90 halogen downlighters. We replaced the lights with LEDs and started dealing with the draughts. In 2010, I started capturing data on our energy usage - just how much oil and electricity were we getting through?



One way of tracking and standardising this is to measure it in terms of kg of CO₂ released per square metre of a home in a year. There's some data here;

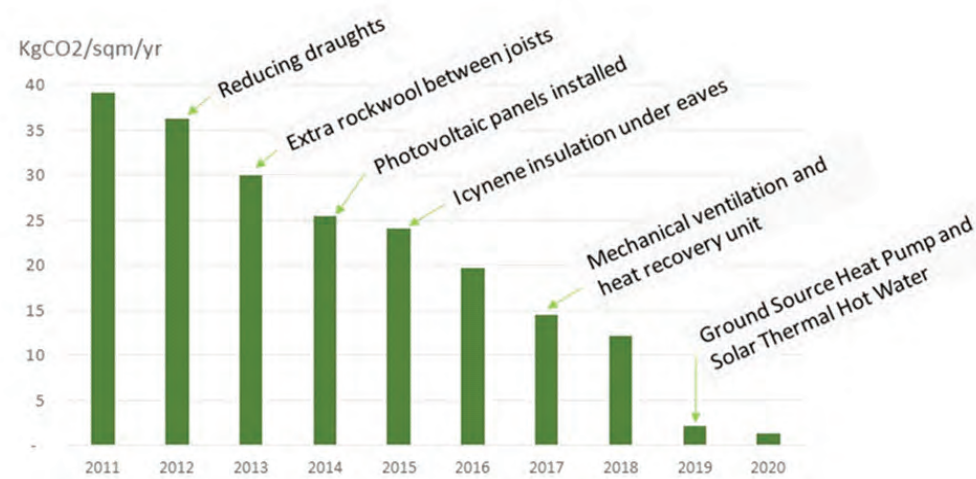
www.carbonindependent.org/15.html on how to work out this figure, although see <https://carbonintensity.org.uk> for more accurate data on carbon intensity of grid

electricity in northern Scotland.



- In 2011 - the first full year of data, this figure for our house was 39.1kgCO₂/m²/yr. Obsessive draught sealing continued and we added more rockwool insulation to the loft - 300mm in total.
- By 2014 the CO₂ figure had dropped to 25.5kgCO₂/m². In 2014 we had 9.2 kWp photovoltaic panels installed, including a switch to send spare electricity to the immersion heater, reducing our oil consumption. The following year we had open cell foam insulation sprayed under the eaves and injected into the cavity around the doors and windows.
- The building was now becoming more airtight but we still needed to leave trickle vents open to provide adequate ventilation. I begrudged letting all that warm air escape in winter so in 2017 we had a Mechanical Ventilation and Heat Recovery Unit fitted. This meant we could close the vents and still have a well ventilated house, while not losing much heat. In 2018 the carbon figure was now down to 12.2kg CO₂/m² but we were still burning oil.
- In 2019 we had an extension built and decided to change the heating system at the same time. We got rid of the oil boiler and changed to a Ground-Source Heat Pump - a liquid like antifreeze is pumped down a loop of pipe in a

borehole and this is warmed by heat coming from the centre of the earth. The small amount of heat is then concentrated and used to heat the home and its water. We also added solar thermal panels at this time. In 2020 the carbon figure was down at 1.2kg CO₂/m².



Where's the remaining carbon coming from and can this figure be lowered further?

Although the electricity grid in the north of Scotland benefits from a lot of hydro and wind-generated electricity, at times it also uses gas. At the moment of writing, 18% of the electricity in our district's network is being generated via gas turbines. This proportion fluctuates through the day according to factors such as demand (how cold and dark it is and how much tea is being drunk) and the wind-speed. With a smart meter, and the trend towards open data, it's becoming possible to know at any given moment, how much CO₂ has been released to make the electricity we're currently using in our homes.

So to get our CO₂ figure lower we would need:

1. The grid to decarbonise further - e.g. more pumped hydro storage
2. To be able to store low carbon electricity (typically electricity generated 1-4am) and use it at high carbon times (typically 9am and 5pm).
3. To store our own electricity, generated from our PV panels, and use it at night.

To address 2 and 3 we've just had 27kWh of battery storage installed. This should mean that for 6 months of the year we're just using PV electricity and our carbon figure will be 0kg/m². However, in winter we're still going to need to pull most of our electricity from the grid.

It may mean though that from 2021 we can start to measure our CO₂ emissions in grams rather than kilograms.

I want to make my home warmer and save money- but where do I start?

The two key areas are:

1. Improved energy efficiency (e.g. insulation such as wall and underfloor).
2. Modern heating systems (which in Udnby is likely to be mainly a move away from oil to heat pumps).

The first port of call is the Home Energy Scotland website, www.homeenergyscotland.org. Run by the Scottish Government, this site provides information on the loans and grants available and gives details of how to contact an 'In-Home Specialist'. These advisers discuss with you your heating options based on your property and provide a comprehensive personalised report ('a Home Energy Selector Report') along with a series of leaflets covering everything you need to know including financial support. The same 'In-Home Specialist' is also available to give advice on an on-going basis if you decide to take action. There is no cost for all this help.

The starting point is good insulation and financial support for this, and for getting the Renewable Heat Incentive (see below), depends on recommendations in a new or recent Energy Performance Certificate for your home (these are easy to obtain but the householder needs to pay a small fee for this).

So what financial help is available? Well, quite a lot. As the funding schemes change from time to time, full details are not given here. Up to date information is available on the Home Energy Scotland website. The following is a flavour of what is available as of April 2021:

- Energy and money saving improvements for homes- interest free loans.
- Assistance to home owners and tenants struggling to heat their homes- HEEPs Warmer Homes Scotland Scheme.
- Payment for every unit (kWh) generated by a renewable heating system, such as a heat pump, under the Renewable Heat Incentive (RHI). Regular receipt of these means that a new system pays for itself over a period of time.

With the drive to change domestic heating to low or zero carbon systems in the coming years both the Holyrood and Westminster Governments are likely to introduce new financial incentives very soon- keep an eye out for these on the Home Energy Scotland website.

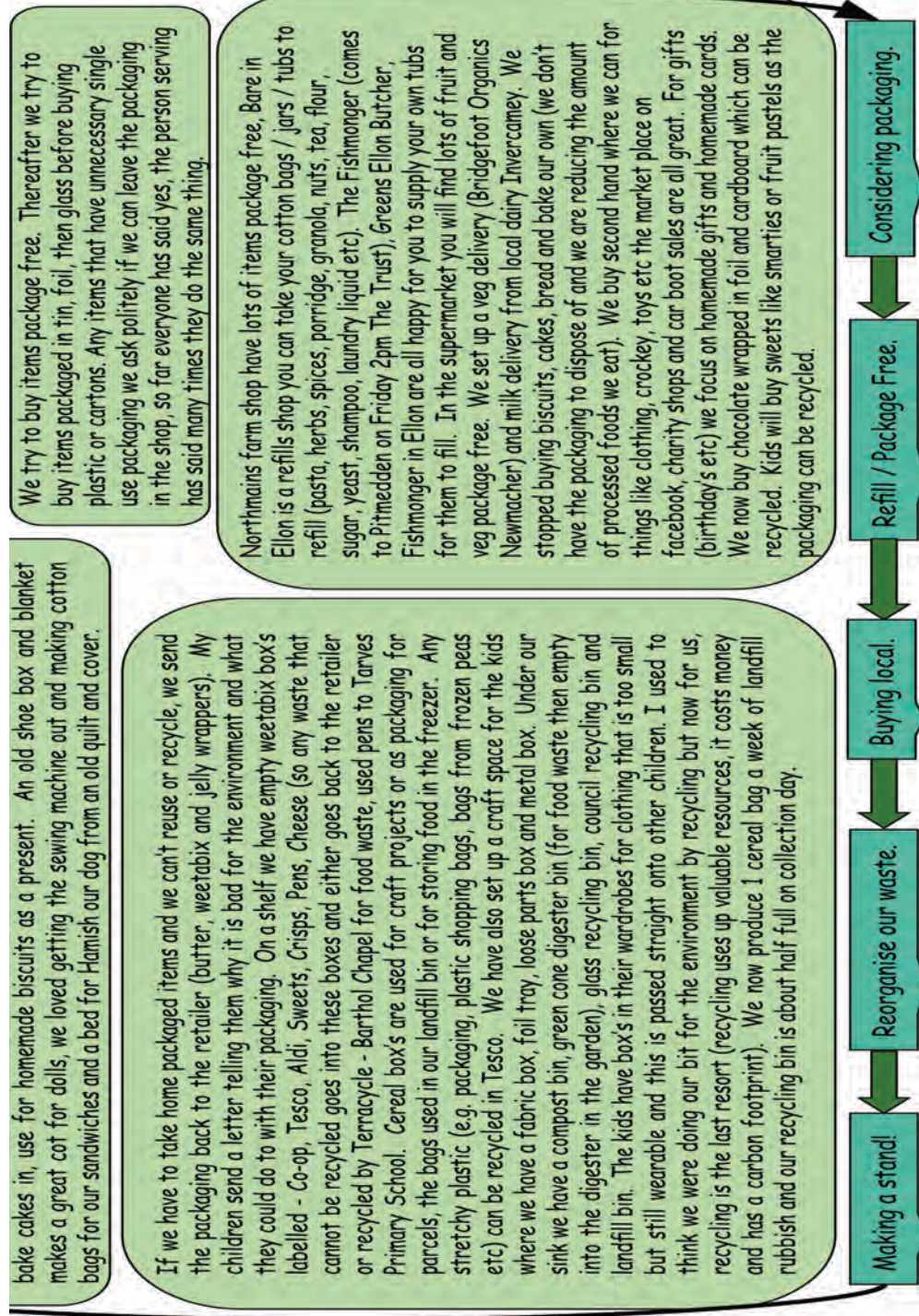
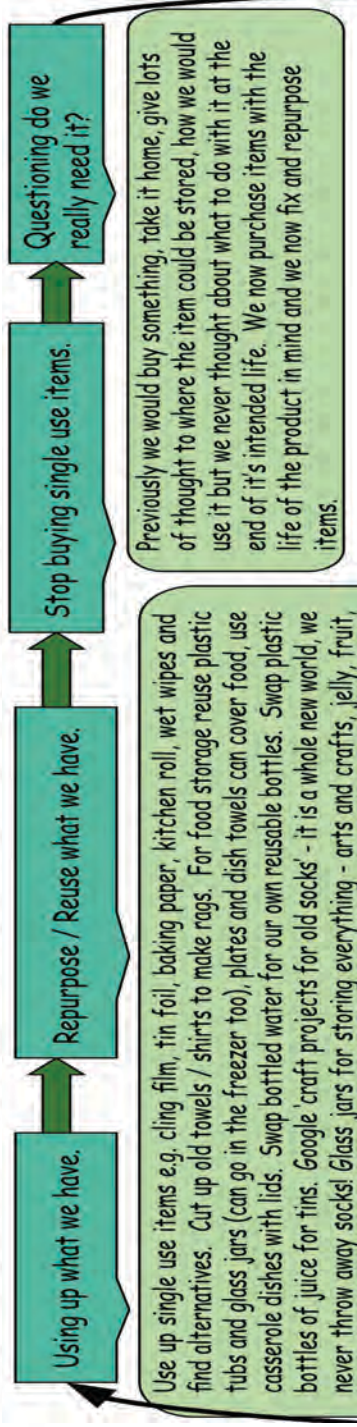


Zero Waste (Almost)



Family Zero Waste Challenge

We are your average family of 6, we never gave much thought to what we bought, I would deliberately go shopping for plastic (tubs, cups, trays, drawers, water bottles, toys), I was obsessed with plastic (for all the wrong reasons). Roll on 2 years and we are aiming for a Zero Waste lifestyle (it's impossible to achieve 100% Zero Waste but we are giving it a good go). We watched War on Plastic (BBC iPlayer) and this forced us to take action. We started our Zero Waste journey by:



Doing the Maths



It's the only way we can really know whether our initial efforts to reduce your footprint have born fruit and whether we are achieving the hardest part - maintaining change or, indeed, lowering things further.

So how best to do the maths? A carbon calculator, of course.

Starting with the headlines: are we big emitters in world wide terms? Sadly, yes. Carbon Independent (www.carbonindependent.org) estimates that each individual in the UK is responsible for emitting 14.1 tonnes of CO2 a year. An American emits more but then the figure for a person in Mozambique is 0.3 tonnes. The average for the whole world is 4.4 tonnes per year.

We (households, businesses, organisations and the government) have a lot of work to do to if we are to meet the targets set by the Scottish Government for reducing emissions.

For individuals and households measuring use is a good starting point. Many of us will have filled in online calculators and taken actions to reduce our footprints based on the findings. What we will have found is that figures can differ wildly depending on what calculators we used.

This isn't because the calculators are necessarily inaccurate but rather that some exclude certain sources of CO2 and some don't. For example, those which arrive at a higher footprint for a household will be including our use of imported goods (e.g. the CO2 used in making a fridge in the Far East) or emissions over which the individual has no control (e.g. mending our roads).

The important thing is to use the same calculator to measure progress, say every three months, as we make changes. Only by comparing like with like in that way will we know whether our efforts are reducing our footprints.

Try using one of the many calculators on the web. Here are two for starters:

- Carbon Independent has a cheap and cheerful one which is to use- www.carbonindependent.org
- For something a bit more comprehensive try- <https://sustainability-in-practice.org.uk/three-to-two-planet-living/carbon-footprint-calculator/>
-



Zero Waste living has had a positive impact on us, we spend less time and money shopping and more time with each other. We consume less and use our imaginations more. We eat healthier our lifestyle is healthier. We have space in our house to enjoy and appreciate the things we do have. Everything has a value. So when items are no longer fit for their original purpose we really think about how we can reuse that item.

I am not an expert on zero waste but we are trying our best to lead a zero waste lifestyle. If you would like any help, if you have any zero waste ideas, if you can help us on our zero waste journey or perhaps you would like to join our Udry Climate Action Group Committee please do not hesitate to get in touch vikkiannetta@gmail.com For further information on Zero Waste see:

Websites:

<https://www.terracycle.com/en-GB>
<https://www.lovefoodhatewaste.com/>
<https://www.zerowastescotland.org.uk/>
<https://www.aberdeenshire.gov.uk/waste/household-rubbish/a-z-list-of-materials/>
<https://www.recyclenow.com/what-to-do-with>
<https://www.peacewiththewild.co.uk>

Videos / Films:

War on Plastic
<https://www.bbc.co.uk/programmes/m0005xh7>
Sir David Attenborough A Life on Our Planet
<https://www.youtube.com/watch?v=rccOV2YadSg>
Bea Johnson, 2 adults, 2 kids, Zero Waste:
<https://youtu.be/CSUmo-40pqA>

Facebook, there are so many groups you can join including:

'Udry Climate Action Group', 'Pitmedden Nu 2 U', 'Udry and Surrounding area buy sell, swap, advertise', 'FOCS - Reduce, Reuse, Recycle', 'Formartin Freecycle', 'Recycling and Waste Aberdeenshire', 'Foraging in Scotland', 'Zero Waste Scotland', 'Plastic Free Scotland', 'Scotland's Climate Assembly', 'Baking to Zero Waste UK', 'The Lazy Environmentalists'.

Food – simplifying the complicated

Food is a bit of a minefield. It's the issue where land use, public health, animal welfare, greenhouse gas emissions, organic farming, transport/food miles and other factors all meet; some would say collide. If that wasn't enough, there is the choice of being a meat eater, a pescetarian, a vegetarian or a vegan, not to mention the Mediterranean diet!

When making a choice, at the risk of a bad pun, there are a few high level 'take aways'

- Food waste, particularly in the West, is something of a scandal. Love Food Hate Waste reckons that throwing useable food away costs the average person in Scotland around £200 a year, and the average household £460. As well as saving money, less waste means less packaging and fewer greenhouse gases. Plenty about the issue here- <https://scotland.lovefoodhatewaste.com>
- Eating vegetables and fruit in season eliminates the need for artificial heating and reduces food miles. Even better is growing some of your own.
- UK Government's Climate Change Committee does not advocate removing meat from diets but recommends reducing our consumption of high carbon meat and dairy products by 20% by 2030 if carbon reduction targets are to be met.
- Buying locally produced food reduces food miles and supports local farmers and producers. Many farmers in the UK are applying regenerative techniques which reduce greenhouse gas emissions.
- A balanced diet is essential for our health.

And what is good for our health is also good for the planet: a balanced diet



More on healthy eating here-

<https://www.foodstandards.gov.scot/consumers/healthy-eating>

How we can make changes? An easy way

1. Over a period of a week, keep a note of all you, or your household, eat
2. Measure the amount of greenhouse gases emitted in it's production using a calculator. This calculator excludes a number of factors but gives a very rough guide <https://www.bbc.co.uk/news/science-environment-46459714>
3. Make the changes you would like to make to reduce your footprint, bearing in mind the healthy diet balance in the diagram above, eating in season and buying locally produced.
4. After a couple of weeks repeat steps 1 and 2 to check the changes you have made have really reduced your emissions. If not, make further adjustments to your diet.

Local produce and waste reduction

The following are outlets in the area which sell local produce and/or supply with reduced packaging. Check them out!

For recycling don't forget Facebook (The Marketplace or local for sale pages), Freecycle or charity shops.

North Mains Farm Shop

Local fruit and veg and home made jams etc. Many items are package free,.

Hattencrook Deli local produce

Bridgefoot Organic Fruit and Veg Box Delivery
Local supplier based in Newmachar

Mains of Leask
Local fruit and veg based outside Ellon. Bare stock their fruit and veg and you can get a delivery.

Run Pet Food Supplier
Based in Aberdeen pride themselves on supplying cold pressed, eco friendly, 100% natural produce

Barra Berries farm shop and local soft fruit specialist

Greens Butcher Ellon
Happy for you to take your own tub to refill.

Aberdeenshire Larder
specialist butcher and game dealer

Farmers markets
Ellon and Inverurie monthly

Wood Recyclability
Products from recycled wood and wood for sale

Bare in Ellon

Zero waste and local produce. Take along your own tubs & bags to refill.

Invercamey milk delivery

Local, fresh milk delivered to your door on a Tuesday and Friday.. Glass bottles.

Udny Provender
local honey;
also vinegar and cordials

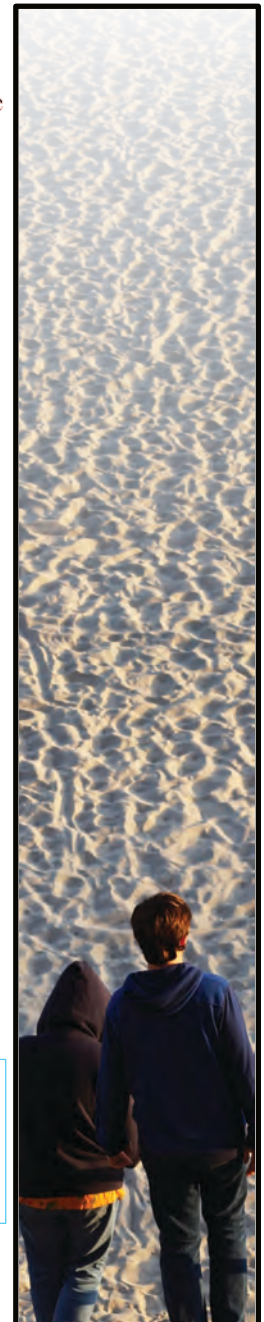
Inverurie Pet Supplies
You can take along your own tubs and refill them with dog treats, stock natural dog chews with no packaging and meat in compostable containers.

Ellon Fish Shop
Happy for you to take your own tub to refill.

Peterhead Fish Company

In Pitmedden at The Trust (the Linsmohr) 2:15 - 2:45 every Friday.
You can take along your own

Shearer Quality Seafood
Van comes to Udny on Wednesday



*Our children are going to inherit a whole lotta footprints.
Thank you for taking an interest*

Just Transition: what does it mean for the North East?

*Dr David Toke, Reader in Energy Politics, University of Aberdeen
(edited by George Allan)*

We only need to think back to the 1980s to know that major switches in the way the economy works can leave individuals and communities adrift. Get the management of change wrong and communities can be scarred for decades.

To reach net zero, economic and structural upheaval is inevitable but what isn't is people losing out. To smooth the pathway to the future, The Scottish Government has set up the Just Transition Commission. Its role is to advise. The principles it is working to are that change should;

- lead to sustainable, high value jobs which do not disadvantage the current workforce
- Address inequality and poverty to ensure that no one is left behind.

What a just transition should mean for the North East.

The community should take the lead in new energy technologies, which will include things like offshore wind, green hydrogen, heat pumps and local district heating. It also should be a bottom-up discussion about these things and care should be taken not to ride roughshod over community groups.

The North East needs a vision for genuinely sustainable new technologies to be based in the area. The skill sets of small and medium enterprises in the area need to be oriented towards these new sectors through training and incentives for development of these technologies.

Aberdeen should take a lead in these. We can begin the transition straight away, for example installing large scale heat pumps to serve the district heating networks of organisations like Aberdeen Heat and Power and the University of Aberdeen so that they can switch from natural gas to using electricity that is becoming greener all the time. We can promote the establishment of companies manufacturing and servicing the domestic heat pump industry – and lobby the Scottish Government to give grants and incentives to favour heat pumps (current incentives treat heat pumps as if they were gas boilers).

This all sounds good but is there a catch?

What a just transition shouldn't mean

What it should not mean is a top-down attempt to perpetuate the existing oil and gas industry by considering the dead-end road of converting natural gas, a fossil fuel, into hydrogen (called 'blue' hydrogen) and then trying to store the carbon dioxide produced. Yet that appears to be exactly what is happening.

We should ask this question: if it was not for the climate change targets, which technologies can be developed anyway to solve existing problems? We could well come up with the same list as outlined above – offshore wind, green hydrogen and heat pumps.

These are technologies that involve clean energy and whose costs are declining and/or likely to decline. Set against this, blue hydrogen is a technology where greenhouse gases will escape (fugitive methane emissions, incomplete hydrogen conversion, extra energy usage to drive the whole system).

Heat pumps use energy around three times more efficiently than hydrogen.

Does this mean that there is no role for hydrogen? No, it doesn't. But it will be limited to providing for the markets that renewable electricity cannot directly serve, such as energy storage for when the wind does not blow and specialised industrial purposes such as steel and concrete production and shipping.

The energy needed to electrolyse water to produce hydrogen should come from green sources. Further development of the latter will bring costs down.

Oil and gas interests are pushing blue carbon on the basis that the Government will invest enormous amounts of money into converting the UK's domestic gas distribution to hydrogen: this is not the route to decarbonising the UK's heating systems. The Government mustn't allow vested interests to dictate the shape of our future energy mix.

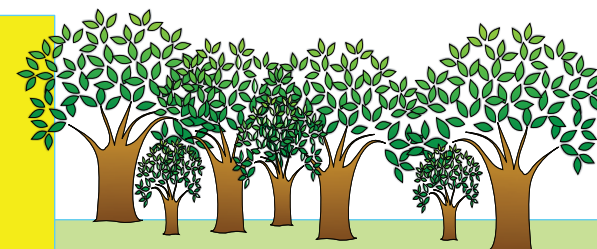
The way we should go

- What we need is a bottom-up, transparent discussion of what new technologies should be supported and how communities and business can prosper most in the long term as we move forwards towards a sustainable energy future.
- The emerging technologies will provide high quality jobs if the Government invests in their development and in the retraining of workers.
- Blue hydrogen is not the future.
- There needs to be a focus on reducing the scourge of fuel poverty.

How Bad are Bananas?

Mike Berners-Lee's popular book 'How Bad are Bananas?' makes a good stab at presenting the carbon footprint of just about everything. If you want to know how much CO2 it takes to make a loaf of bread or be cremated, it's all here. Written in a very readable style, it is an essential guide to informing our choices.

And what's the answer to the banana question? – they are pretty good by the author's calculations.



Searching the web? Plant trees for nothing at the same time

Millions of us are searching the web every second and it's gobbling up huge amounts of energy. There is a search engine which addresses this problem head on. Ecosia uses most of its profits to plant trees, primarily in developing countries. Not only that, it's solar farms produce more electricity than searches on it's browser require, so the company supplies green energy to others. A great way to search the web – check them out at <https://www.ecosia.org/>



Udny Climate Action- the story so far

2018

Udny Climate Action formed to build on previous initiatives in the Parish.

2019

Udny Climate Action becomes a sub-group of PUT Community SCIO
Scottish Charity SCO45547).

Complaint ended use of diesel generator powering communications mast.
Fuel efficient driving courses run.

Campaigned, unsuccessfully, for Aberdeenshire Council to declare a climate
emergency.

Regular communication through Pitmedden News and Facebook
established.

2020

Udny Climate Sunday planned but cancelled due to covid.

Successful climate and environment themed art competition run in
Udny Green, Pitmedden and Cultercullen Schools.

Information on waste and recycling developed for Cultercullen Primary
School.

Following community consultation, published an action plan.

2021

Lobbied our MP regarding support for the Local Electricity Bill.

400 trees (mixed native species donated by the Woodland Trust) planted
adjacent to paths.

Friends of Udny Climate Action formed.

Responded to a Scottish Government consultation on its draft strategy
on public engagement on climate issues

Planned for 2021

Online 'climate cafes' to consult with community on the coming changes to
home heating.

Development of a more consistent communications strategy.

Development of a outline plan for what is needed to achieve Zero Carbon
Udny.

Care to help us?

You can-

- Join the group. We meet once every six weeks or so.
Members give as much time as they are able.
Become a Friend of Udny Climate Action.
Receive emails with information about what's happening and what you
can do.
- Share our posts on Facebook.

No time to get more involved? Become a 'Friend of Udny Climate Action'.

Friends of UCA get sent information about what is going on, ideas for
carbon reduction and suggestions for political engagement. We will,
however, promise not to fill you inbox on a daily basis!

Interested? Just email us at - climate_action_admin@udny.org

Has this booklet inspired you or driven you to distraction?

We'd love your feedback, positive or negative, on this booklet and what
Udny Climate Action is doing. We would also like your ideas.
We will only be useful if we reflect what the community wants us to do.

Email - climate_action_admin@udny.org

Why did we print this booklet?

Good question!

Some may argue that we should have published it online only to save
energy and paper.

After debate we thought that-

some of us are happy to read magazines online but how often do we
promise ourselves to look at them later only for that never to happen? a
hard copy on the coffee table is more likely to be browsed.

Once you have finished with it, please pass it on or recycle. Thanks.

Please note, though, that for ease of accessing the web links it is also
available online at

<http://climateaction.udny.org>

The paper used in this booklet meets FSC standards and is part recycled.



Interested in taking an in-depth
look at 'one planet living'?
This is a great website:-
<https://sustainability-in-practice.org.uk/>

Life with an air source heat pump

Sheila Jones

We have had an air source heat pump in our detached bungalow for about 15 years now. We moved from storage heaters to the heat pump system. The reason? -cost and lack of control. As part of the conversion we had to install radiators.

One thing which is important is that the system runs at a much lower temperature than a conventional central heating system. In those early days of the technology that meant to get enough heat to warm the house to the temperature we wanted we needed to get big triple radiators. Nowadays there are much smaller radiators with fans which do the same job. The whole system takes longer to come up to temperature than, say, an oil system but you just factor that into your planning when setting your timers. We have a wireless home system which can be integrated into a smart home if you wished. The advantages of these is you can then look at the history graphs and work out how long it takes for your system to heat up. Or depending on your system it may learn this and switch on your heating when required.

When we got our first heat pump, we received a grant from the Energy Saving Trust to help with the cost. However, at that time it took almost a year; grants were available but there was nobody in Scotland who was registered to do the work! Things have changed. There are now lots of companies now who will design and install and design



systems for you many of whom are based within Aberdeenshire. We eventually got the first grant in Scotland for an Air Source Heat pump system.

Nowadays it is much quicker to get grants and/or interest free loans for the systems. Providing the rest of your house is insulated enough you can apply for Renewable Heat Incentive (RHI- see article entitled 'I want to make my House Warmer and Save Money') which is cash back to yourself and offsets more of the cost of the system. And the question which everyone asks- what about the running costs? When we installed it, our electricity bill halved!

People wonder how it is possible to get heat out of the air and turn it into heat within the house. The heat pump is effectively a big refrigerator - if you stand at the back of a fridge it is quite warm it is this heat which then comes into the house. It is slightly more complicated than that but that is what the black boxes do....

During this winter we were able to maintain the house at a comfortable temperature of more than 22C (well 24C actually). On occasion we do use our open wood burning fire, but this is mainly when we want the cheery effect. One thing we would do if starting from scratch now is to get the system zoned so you can control the system maintaining

different temperatures in different parts of the house. Even better if you can incorporate into underfloor heating in your design.

We like the system and would certainly recommend one- it's heat from fresh air with a small carbon footprint.

Domestic solar panels- still worth it?

A few years ago, there was a thriving industry installing photovoltaic panels on the roofs of houses in Scotland. Householders benefited from green electricity running their appliances and from payments from the Westminster government both for the amount of electricity they generated overall and the excess which was exported to the grid.

A couple of years back, the domestic PV industry collapsed. The government had been systematically reducing the Feed in Tariff paid to householders as the price of panels came down, but the sudden end of the scheme came as a shock.

While the Feed in Tariff is a thing of the past, the government has recently introduced the Smart Export Guarantee scheme which obliges electricity companies to buy the energy not used in the house itself. With this in place, it's time to reconsider whether households would benefit from installing PV panels.

The Energy Saving Trust provides a simple to use calculator which helps to answer the question- www.pvfitcalculator.energysavingtrust.org.uk/

There are, of course, a number of variables including what direction the available roof faces, the number of panels, the slope of the roof etc.

What is good about the calculator is that results are postcode specific- levels of generation will be different in Udnay from, say, the Isles of Scilly!



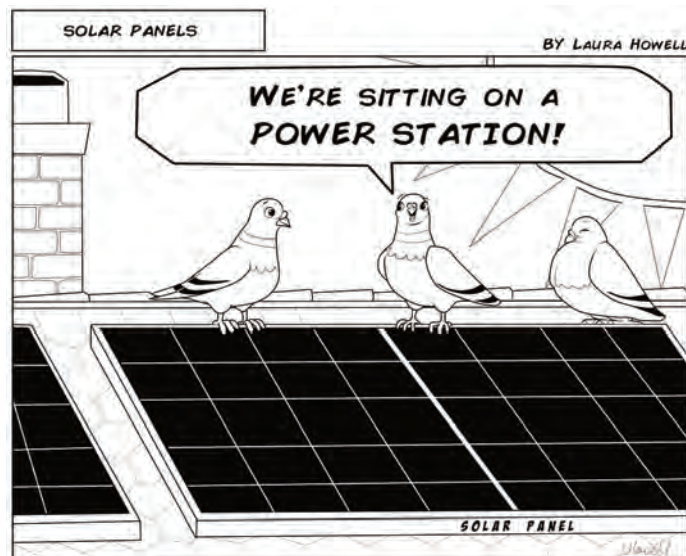
So what might owners of a three bedroom house in Udnay with a south facing roof expect? Over twenty five years and receiving money under the Smart Export Guarantee, the Energy Savings Trust estimates that;

- the cost of installation would be offset by the reduction in electricity bills and payments under the Smart Export Guarantee
- a saving of 21,000 kg of CO2 would be made, a very significant amount.

As a long term investment, PV panels will pay for themselves, as for to reducing greenhouse gas emissions, they are a no-brainer.

A few final points. Panels require no maintenance. The inverter will need to be replaced during the lifetime of the system but the Energy Saving Trust calculator factors this in. While the lifespan of panels is normally stated as 20 or 25 years, they will continue to produce electricity well beyond this, albeit their efficiency lessens very slowly over time.

More questions about solar PV are answered here:
<https://www.moneysavingexpert.com/utilities/free-solar-panels/>



Fuel efficient driving save money, reduce CO2

The Energy Saving Trust reckons that making simple changes to driving style can lead to the average driver increasing their mpg by 15%.

A very rough calculation based on a 10% improvement in mpg, the average mpg of a new car in the UK, the average annual mileage of UK cars and the current average cost of fuel suggests that drivers could **save £75 and reduce their CO2 emissions by 145 kilos a year per car**. A win-win all round. Tips on fuel efficient driving can be found here:

www.energysavingtrust.org.uk/advice/ecodriving

Obviously efficient driving techniques extend the battery range of electric cars too.



Beware the rebound effect

The rebound or take-back effect is well known to environmental scientists. An example: I am concerned about the amount I am spending on heating my home and the consequent high carbon footprint. I take steps to improve the house's insulation. I save money and feel less concerned on both accounts, so what do I do? I stop bothering about switching off lights and checking that the heating is at the right temperature. The financial and greenhouse gas reducing benefits I have achieved are eroded.

The rebound effect can also lead to our spending the money saved on more 'stuff', often stuff we don't need and which has a high carbon footprint. Vigilance is needed to counteract this all too human behavioural response. The money saved can be put to activities or entertainment with a low carbon footprint. If we need to buy things, better quality doesn't necessarily mean a bigger footprint. It can be used to increase our energy efficiency in other areas. From a communal view point, it can be used to support organisations which work to address the climate crisis.

Green electricity suppliers



The electricity grid is a complicated beast. What comes out of our plugs is electricity produced by a number of generators and the mix will depend on what part of the country we live in. The market for selling electricity is separate from this as the companies involved trade in buying the stuff and then billing us for what we use.

A growing number of suppliers state that they sell renewable or green electricity but what does this actually mean? Broadly speaking it can mean that the companies:

1. either put electricity from wind or solar which they have generated themselves directly into the grid.
2. or they buy electricity from companies which have generated it from renewables.
3. or they simply buy power from the wholesale market and buy certificates (REGOs) matching renewable electricity already in the system against what their customers use.

Option 1 is obviously a greener approach than option 3 although all of these do put pressure on the generating companies to increase renewables.

Companies which say they are selling green electricity often don't make clear what they are actually up to. To help, WHICH has provided a guide which tries to cut through all this:

<https://www.which.co.uk/news/2019/09/how-green-is-your-energy-tariff/>

The WHICH article assesses Ecotricity and Good Energy as being the greenest, with a number of others not far behind.

This is another case of the need to do a bit of investigating, rather than relying on advertising, if thinking of making a change.
<https://www.which.co.uk/news/2019/09/how-green-is-your-energy-tariff/>



The Changing Energy System

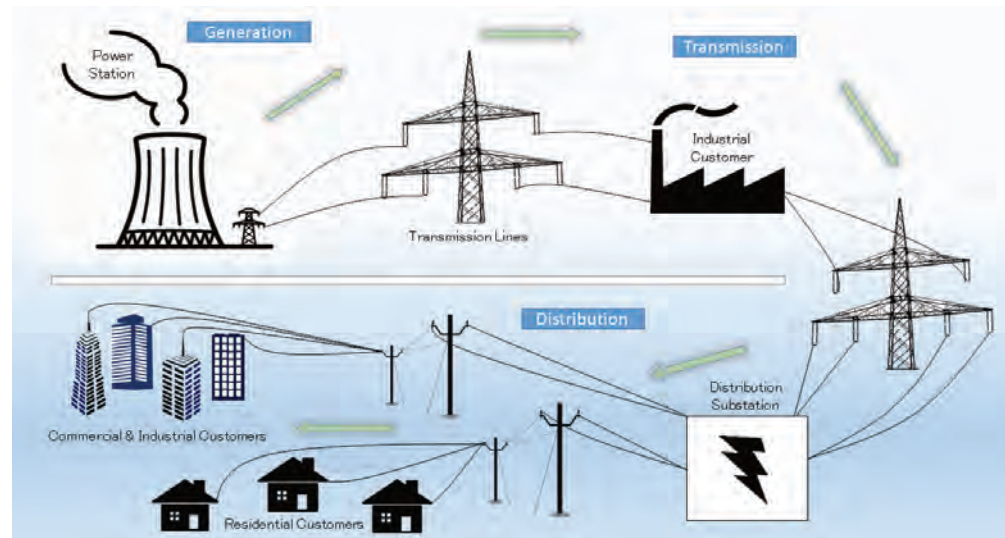
Victoria Mackay (Community Energy Scotland)

What do we use energy for and how is energy production changing?

In Scotland fuels for heating account for approximately half of all energy use, with the remaining half split evenly between electricity and transport. Of Scotland's 2.5 million homes, around 4/5 use mains gas as their primary heating fuel. The remaining 1/5 use either electric heating, such as traditional storage heaters, or other high emissions fuels such as heating oil, LPG or coal.

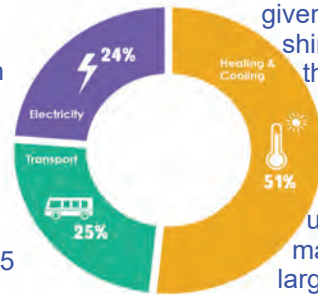
Until recently, most of our electricity came from big power stations using coal, gas, nuclear or large scale hydro. However, over the last 15 years there has been a huge increase in electricity coming from renewable sources as a proportion of total electricity production.

A Traditional, Centralised Energy System



Low carbon renewable energy comes from the wind, the rain, waves, tides and the sun, but we can't control these

as easily as traditional sources because they are not available 24/7, year-round. While a coal plant, for example, can be turned off and on at any given time, renewables can't be 'turned up' exactly when we need them because we can't control how windy it is on any given day or force the sun to shine at night. To counteract this, it is important to have a good mix of renewable technologies to draw energy from as well as the ability to store it for later use. In the short term we may need to retain some large scale plants as back-up to cover spikes in demand but longer term improvements in battery technology, network infrastructure upgrades and changing when we use our energy will reduce our dependence



on these over time. Unlike the big coal, gas and nuclear power stations, as well as large scale

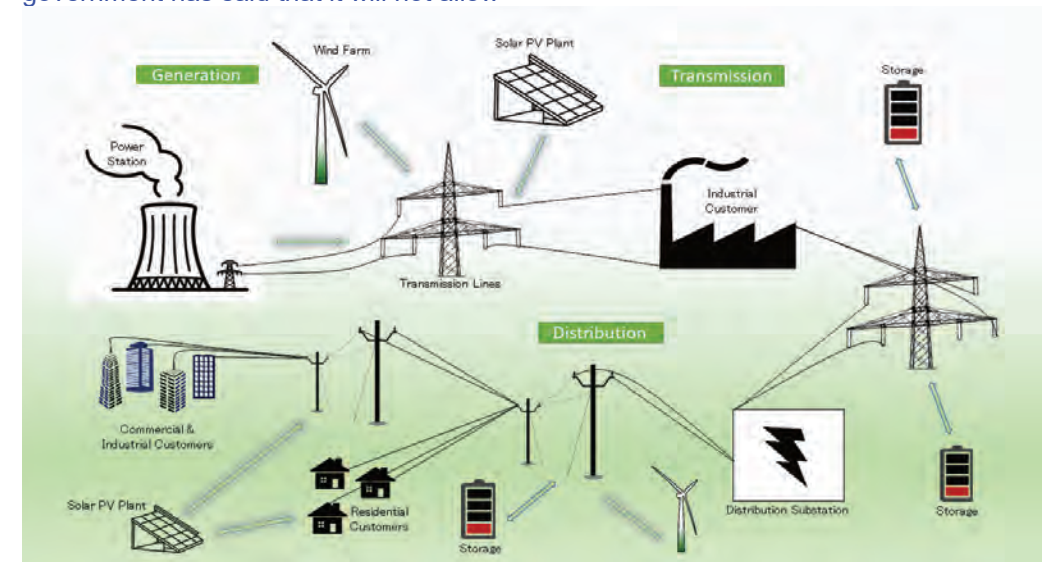
onshore/offshore windfarms which connect to large, robust power lines, smaller scale renewable energy technologies tend to be scattered all over the country and will need to connect to much smaller power lines that have more limited capacity to deal with electricity flows. In many areas across Scotland, it is very difficult and expensive to connect renewable technologies to the grid because the power lines may have to undergo costly upgrades to cope with these new power flows.

The Future Decentralised Energy System; What kind of changes can we expect?

In Scotland, we have been hugely successful in our efforts to decarbonise electricity, with renewable sources currently supplying over 90% of our total electricity consumption. However, we still have some way to go to decarbonise heat and transport. In an effort to drive this forward, the Scottish and UK Governments have set stretching carbon emission reduction targets for heat and transport. To help meet these targets, the Scottish government has said that it will not allow

the sale of petrol or diesel fuelled vehicles from 2030 and both the UK and Scottish governments are encouraging people and businesses to switch to electric vehicles (EVs) by providing subsidies and support in the form of grants and loans to buy and use EVs and to install EV charging points. In terms of heat, most Scottish homes are heated by gas and oil – primarily oil in Udn. This will need to change if we are going to meet Scotland's targets for reducing heat emissions in the coming years. We will need to reduce how much energy we use – turning things off when we don't need them, insulating our buildings more effectively, and using energy efficient light bulbs and appliances. We will also have to replace our gas and oil boilers with electric sources such as heat pumps and storage heaters, solar thermal systems (for hot water) and biomass boilers. Green gases such as green hydrogen and biomethane will also become an important heat source in the future with the Scottish Government aiming for 20% of the mains gas grid to include green gases by 2030.

This shift away from fossil fuels to using predominantly electricity for heat and



transport will put significantly more pressure on the grid which is already struggling to cope. The network operators responsible for maintaining power lines in Scotland are working hard to make the necessary upgrades but how and when we use energy will also need to change and we will need to be much more aware of how much electricity we are using and for what purpose. Smart meters in our homes and businesses will allow us to do this – they measure the amount and cost of

the electricity you use which can then be viewed on an in-built display. Currently all energy companies are required to encourage customers to install smart meters so that we can better understand and manage our energy use.

To find out more about how these changes are likely to affect you on a day to day basis, see our article on “The Future; Heating our Homes...”

The challenge of hard to insulate homes in the NE

*Amar Bennadji (Senior Lecturer-Robert Gordon University) and
Mike Bauermeister (Operations Manager-Kishorn Insulations Ltd.)*

This article gives an overview of different wall construction types and highlights a typical wall construction that represents challenges to the insulation industry and academic research.

Buildings use over 43% of energy in the UK and contribute to over 35% of the CO2 emission. Reducing the energy demand of these buildings could be challenging, depending on type of construction. This article considers the most challenging type of construction to insulate, called Hard-To-Treat (HTT). Amongst 26 million existing dwellings, over 40% are HTT.

HTT buildings can be timber or steel frame constructions or have solid masonry walls. The latter represent 70% of them, hence the dimension of the problem. The challenge is mainly in applying a layer of insulation due to their construction technique. In Scotland, the residential sector accounts for 33% of carbon emissions with the majority of that coming from heating, hence addressing these buildings is a priority. Of the domestic stock in Scotland, approximately 19% is traditionally constructed (i.e. built before 1919) and perceived as “hard to treat”. Depending upon the period in which a building was constructed and its geographical location the method and materials used will vary. In Aberdeen, most buildings are of granite. Other materials used in HHT houses include sandstone, limestone, fieldstone, and more recently man-made concrete stones. Typically, walls are between 400-600mm thick and finished on the interior with plaster and lath on timber battens.

The problem with solid walls

Solid wall constructions have a poor thermal performance compared to current insulation materials. However, there are difficulties in attempting to model the energy performance of masonry buildings due to the lack of information of traditional materials and the discrepancy between the data obtained through the simulation software and the in-situ calculations (*Baker, 2011*). Traditional buildings deal with moisture in a completely different way than modern construction. The latter try to keep humidity out using impermeable barriers; traditional construction uses the porosity and permeability of natural materials to buffer and slowly evaporate the moisture (*Urquhart, 2007*). Types and characteristics of materials used in construction vary in each region and, therefore, the building performance will vary too. Changes on the hygrothermal characteristics of the envelope's layers due to internal insulation or inappropriate repointing could lead to condensation deep in the walls and thus deterioration of the

lath and plaster, fabric decay or even structural failure due to the degradation of timber joists ends.

To control internal moisture, masonry constructions rely on air renewal in order to avoid condensation and mould growth. Ventilation is usually achieved by uncontrolled air leakage and, therefore, it is not suitable to be adjusted depending on the external conditions or the indoor air quality. Besides the effects that may have on the fabric conservation, dampness and inadequate ventilation are the main factors for the presence of biological agents associated to occupants' health problems (*Afshari et al., 2009*).

The importance of the right methods

Installing insulation on a masonry wall may increase the risk of condensation and damp in walls, if not done using materials and methods appropriate to the property in question. Walls receive moisture both from inside the property (via everyday living) and externally (via precipitation). If walls are insulated internally, and especially when a Vapour Control Layer is used, they will not dry off to the inside – only to the outside. In wet climates, this means the wall rarely dries out, especially in winter. Insulation traps heat inside the building, meaning that external walls can become cold, so any moisture trapped in them is less likely to evaporate and may well be retained except in the summer months. In winter, moisture may freeze, causing associated issues. The potential severity of this moisture-trapping problem depends on a number of factors specific to the individual property. Furthermore, as the external walls remain cold, the margin between the wall temperature and dew point (the temperature needed to turn moisture vapour into liquid) is reduced. This means water vapour trapped in the wall, if it reaches dew point, will turn into liquid, increasing the level of moisture in the walls. Moisture present deep in the wall can be a particularly difficult problem to eradicate.

Corrachree House: successfully insulated

Corrachree House is a HTT building. Kishorn Insulations Ltd reduced the house's energy demand for heating considerably by improving its wall thermal resistance to heat loss. Kishorn used Icynene, a breathable open celled spray foam that allows moisture to diffuse through it and eventually evaporate, hence avoiding the above issues. The insulation was applied by first drilling a grid pattern consisting of 10mm holes, 600mm apart on the perimeter walls. Using an endoscope the Kishorn team checked and removed from the cavity any build up of debris that could cause cold bridging to take place. The insulation was then injected into the cavity where it expands, fully filling the void. The team then used a thermal imaging camera to ensure that the injected insulation had achieved a full fill of the wall area.



The installation at Corrachree House also included application of Icynene spray foam to the pitched roof and underfloor areas. Prior to the installation the property had an EPC rating of F (37). After the above installations, the EPC rating improved to D (58) with an estimated saving of £1,400 on the owner's energy bills per year.

Ongoing research at the Robert Gordon University (RGU) as part of a consortium of 14 EU partners in (Stronghouse) project, suggests that buildings should be scrutinise for their readiness to be insulated. A protocol of insulation process was developed by RGU and Kishon Insulation Ltd to optimise the process and eliminate potential risks, with the target to see more building being insulated with minimum risks to meet Net-Zero together.

For information on Kishorn Insulations Ltd - <https://kishorninsulations.co.uk/>

Reference

Afshari, A., et al, 2009. "WHO guidelines for indoor air quality: dampness and mould", http://www.euro.who.int/__data/assets/29/03/2021

Baker, P. 2011, "U-values and traditional buildings-In situ measurements and their comparisons to calculated values". Historic Scotland Technical Paper 10.

Herrera, D., & Bennadji, A., 2013. A risk-based methodology to assess the energy efficiency improvements in traditionally constructed buildings.

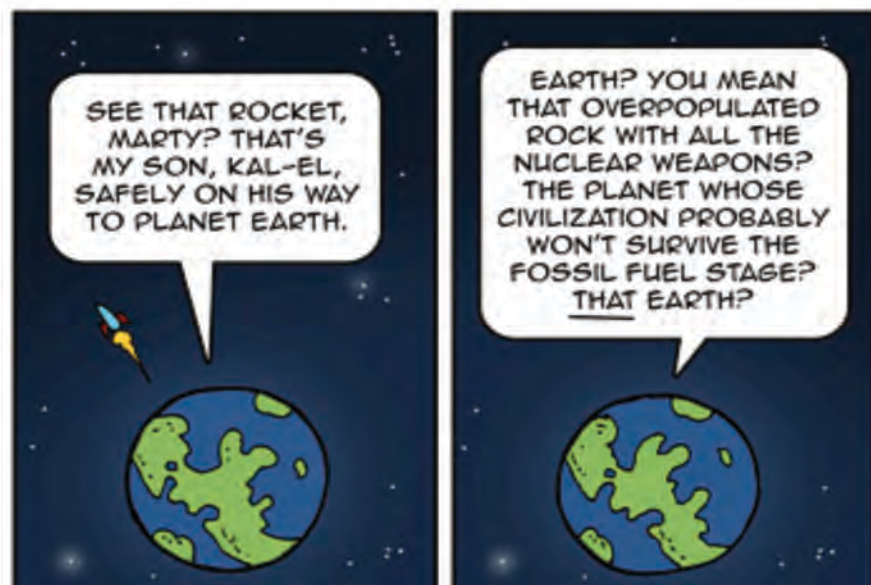
Urquhart, D., 2007. Conversion of traditional buildings, Historic Scotland, Edinburgh.

The above article underlines the uniqueness of every hard to treat house and the importance of getting good advice before undertaking an insulation upgrade.

The following article is an in depth look at a project which improved the thermal efficiency of a typical NE granite house. The homeowner says that, if he started now, up to date knowledge would lead to an even better outcome!
<https://sustainability-in-practice.org.uk/wp-content/uploads/2019/03/BuildingRefurb.pdf>

Udny Climate Action Notes;

Every older house is unique and it is essential to obtain up to date technical guidance and also advice from mortgage lenders about the materials it is intended to use before upgrading.



Fairtrade and climate change what's the connection?

Fairtrade's farmers are among the people who have contributed the least to the climate crisis but are already feeling the worst of the effects- from droughts and crop disease to floods, heatwaves and shrinking harvests.

17 people from Cote D'Ivoire have the same combined carbon footprint as one person in the UK. Yet studies suggest Africa is the continent most vulnerable to climate change. For this reason tackling climate change has become central to the Fairtrade movement, and training in climate change mitigation measures is now part of the support which Fairtrade provides for their producers. To achieve Fairtrade certification, producers must now meet additional climate focused criteria, as below



Fairtrade standards require farmers to

- Adapt to climate change
- Reduce greenhouse gases and increase carbon sequestration
- Avoid deforestation and protect forests
- Tackle soil erosion and increase soil fertility (e.g. through adding compost)
- Reduce water wastage



So, to reduce our own emissions it makes sense to buy locally produced food, while choosing Fairtrade products for those items we can't grow here, such as coffee, chocolate, rice and cotton.

For more information on Fairtrade and climate change, go to www.fairtrade.org.uk/media-centre/blog/choose-climate-action-5-simple-choicesyou-can-make-today/



Udny's own power station - its history and operation

Garth Entwistle

The Udny Community Wind Turbine – the first on mainland Britain to be planned, built and financed by a community was commissioned in 2012. The “five” who made this happen – Brian McDougal, David Murray, Matt Kaye, Mike MacDonald & Garth Entwistle – were encouraged and inspired by the development of similar turbines on the Western Isles, Orkney and Shetland. Now community ownership of energy generation, whether it be by wind, solar power or hydro, is fairly common throughout Europe and N. America.



Planning

It wasn't easy for a bunch of people with little understanding of the economics of wind turbines. WE had a lot to learn. It all started way back in 2006 when Garth presented this idea to the Udny Community Council. An idea based on his recent experience of working with large commercial UK wind turbine projects. The returns looked good. A small group of people, eventually the “5”, was formed. Some joined as others fell away. Many who were invited to contribute their project management experience thought us crazy and advised us against it. They were clearly wrong. Our project with very favourable government supports, the Feed-in-Tariff fixed before it fell away to zero and the sale of electricity generated within various Power Purchase Agreements (PPAs) negotiated on a regular basis, gives us an Internal Rate of Return (IRR) calculated to be around 20-21%. A very attractive return.

Hard graft

Working steadily, meeting regularly at Brian's house on Thursday evenings for coffee and a famous cake – the “Battenburg” – we found our way to the selection of a suitable site, the Smith's farm at Tillymaud, with a good wind resource (7.6m/sec); found a bank willing to support us – Triodos - but only after enormous due diligence; selected a turbine – the Enercon E48 – a 800kW machine with a 80m tip height, already well established on several farms in the North East; and, with Green Cat Renewables, submitted a planning application. The trust these people showed in our community group was amazing. When, for example, some serious money was needed, Social Investment Scotland stepped up at our first meeting in David's office – the only office we had that looked remotely serious – with a £54k loan. The access road was built and the turbine ordered before our bankers had confirmed their “Financial Close” and offered to release funds. We borrowed almost £1.5m with only the security of the turbine. Initially, we had asked for £900,000 when offered various grants but, when we were required to pay these grants back due to EU de-Minimis rules, Triodos eventually stepped up to finance the lot. Triodos was always with us. We think it was the Battenburg cake everyone who met us was offered. Of course it was more than that but everyone liked our community-based approach and wanted to make this project work.

Success

Anyway, after winning various awards, British Renewable Energy Award – Finalists – 2011, Scottish Renewables Green Energy Award - Best Community Project 2011; the turbine was eventually commissioned on the 6th July 2011. Since then it has regularly achieved the 29.2% annual average of total capacity forecast by Green Cat Renewables given our 7.6m/second average wind speed. Not every year though. Wind is very variable. We have averaged 30% capacity since commission over a range of 27% in this last year, a poor year for wind, to 34% tops, a great year for a wind turbine. After bank interest and loan re-payments and operating costs, we have been able to transfer approx. £150,000/yr to our parent company the Udny Community Trust. This Trust uses this to fund various projects in and around Udny. Most recently was the purchase and refurbishment of the Linsmohr Hotel in Pitmedden as a new Community Centre with its own café and the prospect of hosting various significant community activities. Watch this space for new announcements re: these activities. None of the “5” receive any income from the turbine but do enjoy a dam good dinner together once a year. They deserve it.

The benefits: community developments and green electricity

When this project was first presented to the surrounding community, we thought we would highlight its environmental credentials. Its net zero carbon footprint, the reduction in CO₂ emissions, its community benefits and relatively small visual impact. Given the times we were in, of these, we eventually highlighted only the significant community benefit it would give to Udny and its surrounding areas. Now, in 2021, we think the clear environmental benefits would be highlighted. While the income flowing into the community will always be important, the global awareness, never mind the local awareness, of climate change is now hugely significant. Any way a community can reduce its carbon footprint is now welcomed, though, as you know, not always realised. It is not easy to reduce your carbon footprint. The “climate emergency” we are living in will just increase in its intensity. Community groups like ours will increasingly look to act now to safeguard our children's future



Up she goes!
The turbine's
blade assembly is
lifted into place

THE QUIZ

Photocopy and send completed quiz answers along with your name and email address by 30th June 2021. Either by email to climate_action_admin@udny.org Or hard copy to [George Allan, 7 Bothwell Terrace, Pitmedden AB417PT](#) We have two absolutely fabulous prizes of a £20 voucher for either The Craft or The Coffee Apothecary or Cafe 48. Winners will be either the first two correct or most correct answers out of the hat.


Udny Climate Action Quiz

This isn't an exam, it's just a collection of facts we thought remarkable, and all it's intended to do is make us think and talk about the answers.

Some are easy, some not-so-easy, in fact some environmental problems are downright difficult! See how many of these you can manage.

If you can answer more than half of the questions correctly you'll be doing rather well...

And lastly, using Google and Wikipedia **isn't** cheating.

- 1) What size area of grass is needed to offset your mobile phone's energy use for a year? (Think in terms of solar panels)
- A) 48 square feet (4.5 square metres)
- B) 72 square feet (6,7 square metres)
- C) 132 square feet (12.2 square metres)
- D) 168 square feet (15.6 square metres)
- 



- 2) How many national grid KW hours are generated by one tonne of CO2?
- A) 504
B) 3,534
C) 10,729
D) 57,872
- | | | | | |
|--|--|--|--|--|
| | | | | |
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Question 3

On average, how many times is any article of clothing bought in the UK actually worn?

A) ☐ Over 100 times
B) ☐ 53 times
C) ☐ 8 times
D) ☐ Always worn, never thrown away

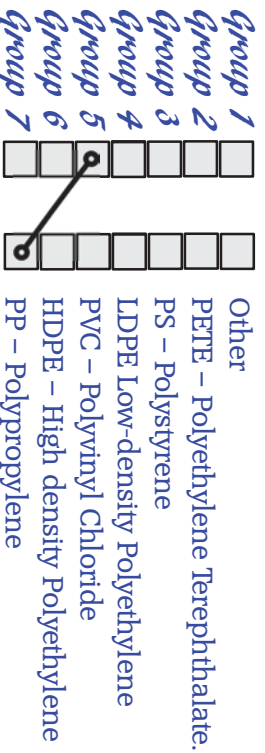


5 We hear a lot about grades of plastic for re-cycling. What are the actual categories?

- 4) How many times should you use a "Bag for Life" in order for it to be more green than using a throw away bag?
- Never, It's still green!
- Once
- Twice
- Four times
- ☐
☐
☐
☐

(Remember when a shopping bag gets old it can be used for jobs like the recycling run or as a grow-bag)

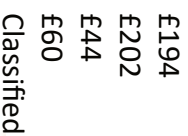
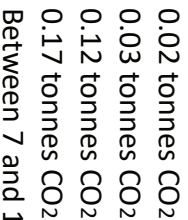
QUESTION 7



Alfie, Betty, Charlotte, Donald and Thomas travel from Aberdeen to Bristol (625 km).

Who uses what amount of CO₂, and what is the cost of the journey for each of them if...

- Alfie goes by air
Betty goes by bus
Charlotte goes by car
Donald goes by Air Force One
Thomas goes by train



- 8) Which of these 10 countries are NOT signatories of the Paris accord?



South Sudan
Libya
Angola
Turkey
Eritrea



Iran
China
The US
The UK
Russia



9) There is a correlation between light pollution and which of the following conditions?

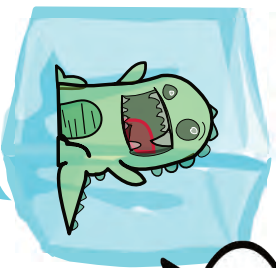
- ☐ Breast Cancer
- ☐ Myopia (short sight)
- ☐ hypogeusia (loss of taste)
- ☐ Stierophobia (Fear of stars)

10) ...and what proportion of children born today will never live somewhere where they can see the milky way?

- ☐ One in twenty - 5%
- ☐ One in three - 33%
- ☐ One in two - 50%
- ☐ Eight in ten - 80%



I'm melting...



11) You can go online and find the concentration of CO2 in the atmosphere over several hundred thousand years.

How could scientists even KNOW that?

They look at shells deposited in ancient ocean floors
 They study ancient writings from past civilisations
 They analyse the air dissolved in ice drilled from deep in polar ice
 They calculate the amount of carbon 14 in fossils

QUESTION 12

What is the efficiency of;

- a) A Dutch Windmill? ☐ 33%
- b) A modern wind turbine ☐ 24.5%
- c) A hydro-electric turbine ☐ 90-98%
- d) A diesel generator ☐ 3.5 - 5%

Question 13

Which of these chemicals has been blamed for damaging the ozone layer?

- ☐ CFCs - Chlorofluorocarbons
- ☐ DDT - Dichlorodiphenyltrichloroethane
- ☐ CO2 - Carbon Dioxide
- ☐ Agent Orange
- ☐ -2,4,5-Trichlorophenoxyacetic acid / 2,4-Dichlorophenoxyacetic acid

Question 14

How is damage to the ozone layer most likely to effect you in the real world?

- ☐ -It increases acid rain and damages crops
- ☐ -It causes an increase in tropical storms
- ☐ -There's more cancer-causing U.V. light
- ☐ -Lower rainfall causes increased bush fires

2 fabulous prizes to be won!