Sustainable Blewbury
www.sustainable-blewbury.org.uk

No. 44 **March/April 2021**

IN THIS NEWSLETTER

Local events and activities
Sustainable Blewbury AGM 20th April 2021
Future Sustainable Blewbury activities
Blewbury Garden Market starts 17th April 2021
Oxfordshire County Council Elections 6th May 2021
Cleve clear-up
Ash die-back in and near Blewbury

Short articles and interesting links
Great Green Wall of Africa
Does the government take climate change seriously?
New energy efficiency labels
Is it Volkswagen or Voltswagen?

Longer articles
Lithium batteries for electric cars?

For the latest news and more information, please see our website

Local events and activities

Sustainable Blewbury AGM 20th April 2021

We postponed last year's AGM in the hope that we could hold a normal meeting this year, but that was premature. We will hold our AGM via Zoom on **Tuesday, 20th April at 8.00 pm**. We will review what we have been doing in the past two years and discuss ideas for future activities (see below). If you'd like to participate, especially if you have suggestions, please email our secretary, Jane Kinniburgh, at secretary@sustainable-blewbury.org.uk for details of the link to the meeting.

Future Sustainable Blewbury activities

One item for discussion at our AGM (see above) will be our future activities post-lockdown to add to our existing ones (Garden Market, apple juicing, hedge laying, wildlife corridor, thermal imaging, newsletter, Blewbury Climate Action). We plan to have more repair cafes in July and September, and a possible nature reserve on the Thames Water site at the end of the concrete track north of the village. There are ideas for tree planting including providing a selection of trees for peoples' gardens, a nature and heritage walk in and around the village, and monitoring the state of our village streams.

Blewbury Garden Market starts 17th April 2021

We are planning to start our weekly stall at the garage earlier than usual this year, on **Saturday morning 17th April**. The stall will run as usual, from 9.15 to 11.15. If you have items to sell (plants, seedlings, flowers, produce, baked goods, preserves, etc.) please bring them at 9.00 am. It helps if you can also bring a printed SB form filled in for goods that you wish to sell. You can find the form at sustainable-blewbury.org.uk/ProduceStallList.pdf.

Please help us to maintain **social distancing**, and could everyone please wear a **face covering**.

You might like to start planting soon with a view to selling surplus fruit and vegetable seedlings. If you would like to volunteer to help on the stall (in a COVID-safe way); please contact either Eric (850558 or 07935 232 296) or John (850372) or email us at info@sustainable-blewbury.org.uk.

Oxfordshire County Council Elections 6th May 2021

The list of candidates' names and contact addresses are available on the County Council's website, in order of name of district, so if you live in Blewbury look for the Hendreds and Harwell list. This means you can write to your candidates and ask about their policies on the environment and climate change, or you may be able to contact them via their party's web page if you prefer. This will be an important local election – the results will determine how the county will emerge from COVID. Look out for Zoomed hustings and use them to question candidates about their policies.

There are three candidates in the Hendreds and Harwell District of Oxfordshire (see tinyurl.com/khzytpsx) and hopefully there will be statements or answers to specific questions about the local environment from all three on the Blewbury Climate Action blog by the end of April.

The council elections are a prime opportunity to get ambitious policies which prioritise a green recovery, and promote policies of fairness and economic justice at the very top of the agenda.
Be sure to use your vote on 6th May.

Cleve clear-up

Photos EE

On 30 March, volunteers spent a useful morning clearing the Cleve of an enormous number of broken-off dead branches and thinning the rampant vegetation on the south bank and along the raised footpath.

Ash die-back in and near Blewbury

Ash die-back is now present in and around the village, and local ash trees are widely infected You can easily spot sick-looking saplings (dead branches, marks on the bark). It is more difficult to see damage in mature trees, as the infected branches are up in the crown of the trees.

Ash die-back arrived in the UK in 2012, on infected trees from Europe. Originally called 'Chalara', it is caused by a fungus called Hymenoscyphus fraxineus. The fungus is dispersed as wind-blown spores and is now widespread throughout the UK. Nearly all of the UK's 80 million ash trees will eventually be killed by the disease. Young trees succumb in a few years, while mature trees will deteriorate slowly over many years. Only about 1% will survive; there is no known cure. Dead and dying trees should be left standing, unless they are a risk to people and property, as they are a valuable wildlife resource as they rot.

In the long term (a hundred years or more), we will get our ash trees back! Disease-resistant strains of ash are being developed, and they will eventually recolonise the UK.

Rather than try to re-write a lot of very good and full explanations, we suggest that you read existing material: a web search on "Ash die-back" uncovers a huge selection. We suggest starting with information from Forest Research, the Woodland Trust and/or the Royal Horticulture Society and following some of the links that they give: tinyurl.com/5zc7bt99; tinyurl.com/wav3bs6t; and tinyurl.com/5vrenrfw, respectively.

Sean Morris

* * * * *

Short articles and interesting links

Great Green Wall of Africa

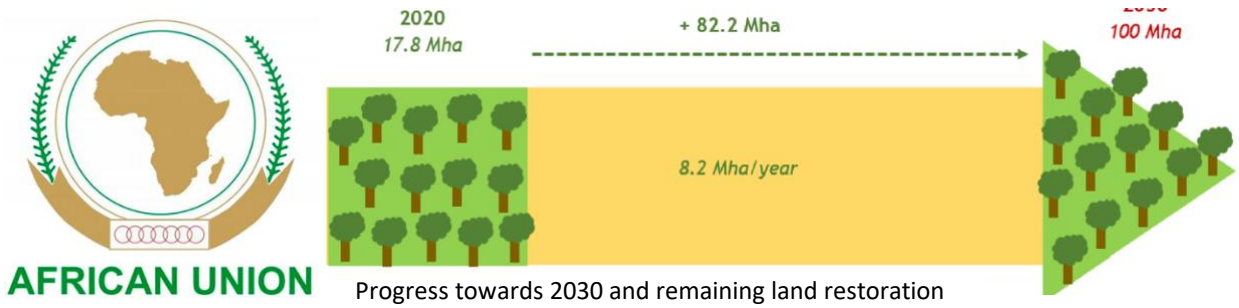
As recently as the 1960s, the Sahel, the land to the south of the Sahara Desert, was a fertile crop-growing area region that supported millions of people, but in the 1970s it started to be degraded, becoming increasingly dry and barren because of the combined effects of climate change, population growth and desertification due to unsustainable land management practices. This resulted in food and water shortages, mass unemployment, migrations, and conflicts.

But people of the Sahel have always hoped that their land could become productive again, and so they started to look for a long-term solution. In the 1980s the idea grew of a great green wall of trees 8000 km long and 15 km wide, that would halt the spread of the desert across the continent from Senegal in the west to Djibouti in the east. It was an ambitious idea, eagerly adopted by the 11 Sahel countries (Senegal, Mauritania, Mali, Burkina Faso, Niger, Nigeria, Chad, Sudan, Eritrea, Ethiopia and Djibouti). It was seen initially as a sort of barrier that would stop the sand blowing from the Sahara.

Trees were supplied and planted from the early 2000s, but not always successfully – there was a lack of co-ordination, water and other shortages. This region of Africa does suffer from political instability, and in some areas there are terrible acts of cruelty inflicted by those seeking power, which makes this project all the more astounding.

The Great Green Wall (GGW) has now been developed through the African Union into a collaborative effort of some of Africa's poorest countries on an unprecedented scale. It crosses geographical, political and cultural divides by uniting people across borders. The impetus for this was provided by France and the UN fourth One Planet Summit held in January 2021, which provided finance needed to accelerate the initiative. The key to the success is that it is now not just about planting trees as a barrier – it is about improving the entire ecosystem. Finance provides tree and vegetable seeds, tools and training and the farmers provide land, water and labour. Fragile communities are being protected,

migration of their young men looking for work in the cities or across the Sahara to Europe is reduced, and biodiversity improved.



Progress towards 2030 and remaining land restoration

This figure above shows that there is an enormous amount left to be done if the GGW initiative is to reach its target of 100 MHa (megahectares) of land restoration by 2030. Only 4% of the work has been done in half the available time. BUT funding has improved and the techniques are better than in the early days of the initiative.

The arrow diagram is from the 68-page report "The GGW implementation status and way forward to 2030" that you can find at bit.ly/3u35jkM. It is not the final version, but do dip into it – you will learn a lot about the individual countries of the Sahel – countries that are rarely reported on in a positive way by the press. And if you search for Great Green Wall online you will find interesting videos. I recommend a BBC Newsnight video from 2017: "The Great Green Wall of Africa: Will it help fight climate change?" at youtube.com/watch?v=HVOYN70scS8.

Jo Lakeland

Does the government take climate change seriously?

As host and organiser of the forthcoming COP26 climate-change conference, scheduled to take place in Glasgow in November, one of the obligations on the UK government is to show leadership in progressing towards net-zero carbon emissions. But actions speak louder than words. Too often, new policies announced by the government show no sign that the climate emergency and the Paris climate agreement goals have been seriously considered while designing and implementing major infrastructure policies. In some cases, environmental organisations have had to resort to the law courts to 'remind' the government that they are legally required to take account of the climate impact of their policies. For an article on a similar theme, see tinyurl.com/ur79pukj.

One example is the proposed expansion of Heathrow airport. When Boris Johnson was mayor of London he opposed expanding the airport, promising to lay down in front of the bulldozers if it went ahead. But now Heathrow expansion is government policy and this, along with other policies on major infrastructure, has been criticised recently by experts including former NASA scientist James Hansen and former UK government chief scientist Sir David King: tinyurl.com/cze8pfj3.

Another example is the proposed new deep coal mine in Cumbria, which would be the first new deep mine in the UK for decades. See, for example, bbc.co.uk/news/uk-politics-56364306. The government had left the decision on whether to approve the mine to Cumbria County Council, but the resulting controversy and opposition of some government ministers (including Alok Sharma, president of COP26) forced the government to propose a public inquiry because approval of a new coal mine looked so bad as a policy.

Proposed deep coal mine

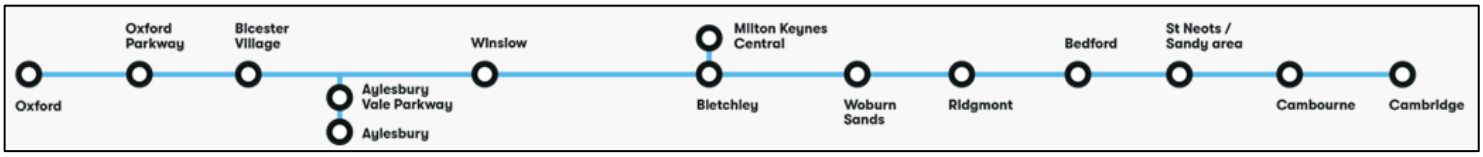
The arguments for the mine stressed that the coal would be for the coking, involved in making steel, but it turned out that most of the coal would actually be exported. However, a report by Cumbria Action for Sustainability pointed out that a serious green programme of work to counteract the effects of climate change in Cumbria and to carry out energy efficiency overhauls of 90% of buildings in

Cumbria over the next 15 years would create well over ten times more jobs than the new mine would. See tinyurl.com/5xd6y5mu.

Road building

It has very recently emerged that the carbon emissions that would result from the government's £27 Bn road-building programme are about 100 times higher than the official estimates. Read the full article about this at tinyurl.com/dsbmzzsh.

Closer to home was the proposal to build an expressway from Oxford to Cambridge, as part of a programme to build hundreds of thousands of houses in the "Oxford–Cambridge Arc", now being referred to as "England's Economic Heartland". The expressway has recently been cancelled (the official announcement is at tinyurl.com/n98s7j5s), but it seems likely that local road improvements needed for all the new houses might get many of the new elements of the expressway built by stealth. It is still unclear how sustainable the building programme is: are there enough jobs, what about the countryside and biodiversity? In addition, the new East West Railway (eastwestrail.co.uk) now being built as part of this programme does not look like it will be electric, and the rail company's website says nothing about climate change or choosing its rolling stock to be green.

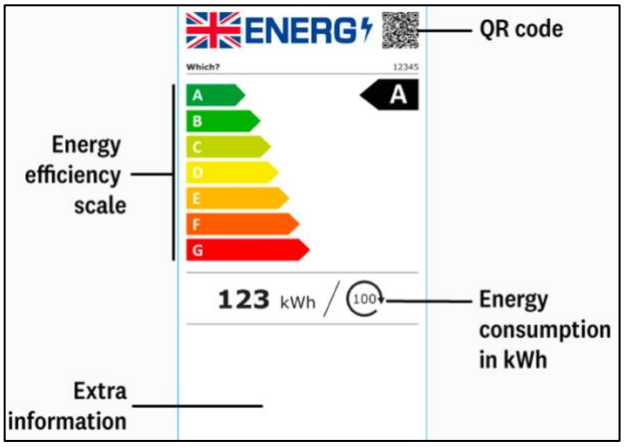


East West rail route

Finally, there was the abysmal failure after less than a year of the Green Homes Grant scheme, discussed in our preceding newsletter (no. 43) which has now been closed. Heating the UK's draughty homes makes up about 14% of the country's carbon emissions, according to the Committee on Climate Change, and the UK has more heat-wasting old houses than any country in Europe. This programme offered financial help to households wishing to install better insulation, or low-carbon heating such as heat pumps. Excessive red tape drove small, local builders away and overall management was handed to an American outsourcing company that mis-managed the grants in various unresponsive ways so that very few applications were actually approved. Following on from the fiasco of the Green Deal that was terminated in 2015 makes the situation look even worse. For more details and information, see bbc.co.uk/news/science-environment-56552484 or tinyurl.com/55dhw2du.

Eric Eisenhandler

New energy efficiency labels



New-style energy label

The EU introduced energy ratings in 1995. If you want to know how energy efficient a new household appliance, or even a small item like a light bulb, is, you have probably looked at EU energy labels because an appliance with a good rating might save you hundreds of pounds per year. Despite having left the EU, the UK has stuck with EU energy labelling standards to avoid confusion.

But as designs improved, things got confusing. In some cases a rating of A was no longer a good one as some items had scales that ran all the way from G up to A+++. A new system of energy labels (illustrated at right) and ratings are now starting to appear; they aim to clear up the confusion. This started in March with washing machines, washer-dryers (now rated separately for washing and drying), dishwashers, fridges, lighting and TVs. Items not yet updated include tumble dryers and ovens.

In addition to indicating likely energy consumption per year (in kilowatt-hours) the new ratings will allow for improvements by starting with no items at all rated A. A QR code on the label will allow smartphones to access a web page with more detailed information.

Repairability

The EU is also putting in eco-design measures to promote the repairability of products in order to increase their lifespan and reduce the number of appliances that are thrown away despite being easily repairable. This includes requirements to make spare parts available for a minimum number of years, and that parts can be replaced with the use of commonly available tools. This could be a big step forward in tackling premature obsolescence. The UK government has committed to matching and even exceeding the EU's eco-design standards.

Eric Eisenhandler

Is it Volkswagen or Voltswagen?

A prematurely leaked April Fool's joke in the US was in the form of advertising that Volkswagen (VW) would be rebranding in the US as Voltswagen. Like many such jokes, there was enough of a grain of possible truth to be convincing. The US car market is the reason the Volkswagen group (the world's second biggest car makers) needs an image change. In 2015 it emerged that for half a decade VW had been selling diesel cars (traditionally anathema in the US market) as clean, eco diesels with exhaust emissions of harmful nitrogen oxides almost as low as petrol engines. But it turned out that this was only due to in-car software that could sense when the car was being tested, and would put the engine in a low-emission mode that would be unacceptable for normal road use.

VW has paid dearly for this deception. In addition to huge reputational damage to its various brands (Volkswagen, Audi, Skoda and Seat) the head of VW-US went to jail, and US customers had to be given large compensation cheques and offers to buy back their cars at pre-scandal second-hand values. Now VW has started to make pure electric cars in a big way, and it seems that the April Fool's joke was actually aimed to promote their new range of electric cars.

In the UK VW has refused to admit that its claims regarding supposedly clean 'eco' diesels were deceptive and criminal. Its new pure-electric car range is now on sale here, and testing has shown that its current diesel models comply with the current European emission standards for diesels. (Disclosure: I had a 2010 VW Golf diesel and I am one of nearly 100,000 UK VW customers in a current UK lawsuit against VW, claiming compensation for deception regarding environmental performance.)

Volkswagen ID.3 and ID.4 electric cars

Eric Eisenhandler

* * * * *

Lithum batteries for electric cars?

by Jo Lakeland with Eric Eisenhandler

Why do we use lithum to power electric cars?

Some background to this article: I bought a Nissan Leaf in February 2020 and was really pleased to have it because it meant that we were no longer driving a fossil-fuel car. It was two years old, therefore recycled, which meant that we did not have to be concerned about whether the manufacture of electric cars has a larger carbon footprint than fossil-fuel cars. But I kept noticing articles about the dreadful effects on the environment caused by lithium mining and so I began feeling

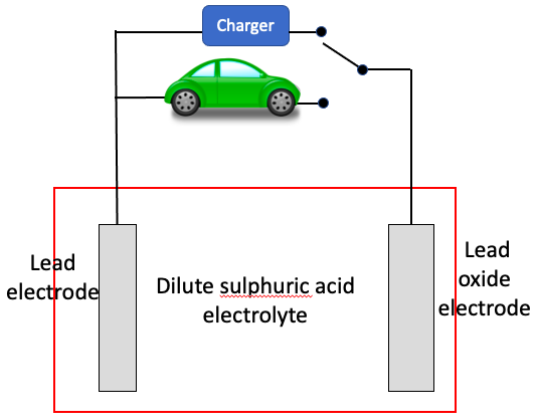
guilty about owning a car that used lithium. Then I wondered what was so special about lithium that meant that it was being used to power the batteries that e-cars use in spite of its environmental problems?

Jo Lakeland

Lead Acid batteries

This diagram may look familiar. It's very similar to a diagram of the lead-acid car battery you may remember from school. (Skip the following paragraphs if it's too much science or if you remember these details)

In the lead-acid car battery the electrodes are lead and lead oxide plates submerged in dilute sulphuric acid (H_2SO_4) which is split into two ions (charged atoms or groups of atoms, with fewer or extra electrons), H^+ and HSO_4^-. This liquid is called an electrolyte because it conducts electricity. The plates are attached to an external circuit and when they are positioned in the electrolyte the circuit is made complete and the ions move towards oppositely charged electrodes.

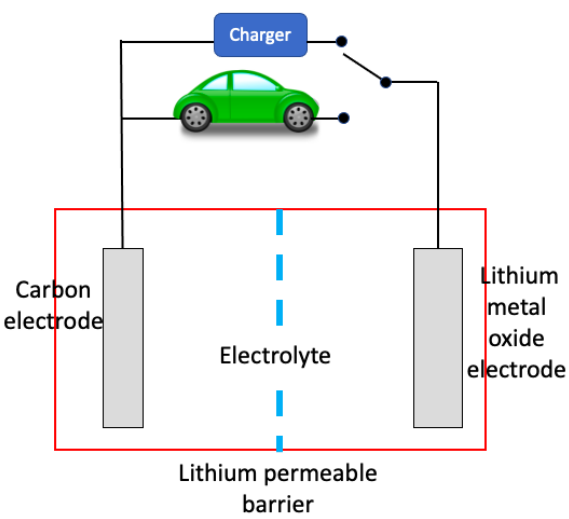


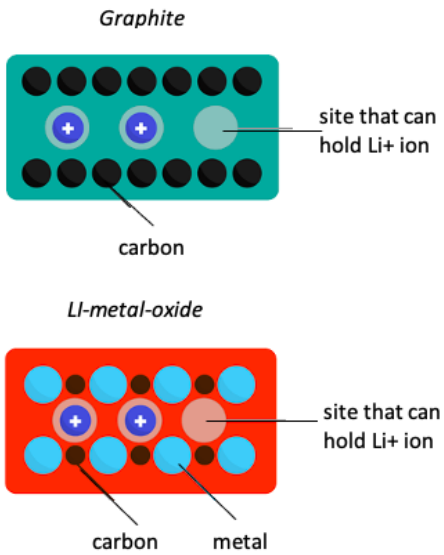
This reaction also produces negatively charged electrons (e^-), which form an electric current that flows from the battery to start your car engine or to run the many electric accessories in your car. The reaction is reversible, which is why the battery is recharged as the engine runs or if you attach it to a battery charger. One more thing before we move on to lithium-ion batteries: the correct name for this diagram is a cell, which are connected together in series to make a battery. Each cell in the car battery produces two volts, so six cells are needed to form a 12-volt car battery. The lead-acid battery is suitable for providing a short burst of a high current to start a car engine, but a different chemical reaction is needed to produce the power and higher voltage needed to power an electric car for hundreds of miles.

Lithium-ion (Li-ion) batteries in an electric car

Li-ion cells work in much the same way as lead acid cells. The electrodes are graphite (carbon) and a lithium-metal oxide.

The electrolyte is a solution of lithium salts in a mixture of solvents, which allows the Li^+ ions to move. The lithium-permeable barrier means that only Li^+ ions can pass through it to reach the electrodes.



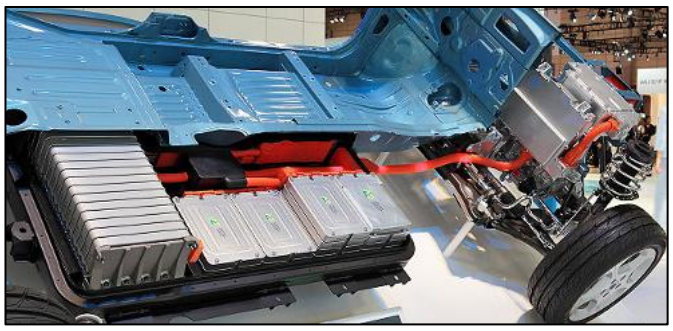


The electrode materials both have spaces within their structure where Li^+ ions can be held and released without reacting with the electrode material. Their direction of movement depends on whether the cell is being charged by plugging into a mains supply, or discharged, providing the energy to make the car move.

There is an interesting short YouTube video called "Inside a lithium electric car battery cut open by EV West" at youtube.com/watch?v=MUg9W4CbZUQ which shows the

many thin layers of electrodes within the pretty pale green plastic battery cover. *Do NOT try this yourself – it's hazardous!*

The cutaway image to the right shows part of a Nissan Leaf's battery pack. It actually extends right across the car, from under the front edge of the front seats to the rear edge of the rear seats.



Nissan Leaf battery pack
by Tennen-Gas, CC BY-SA 3.0 creativecommons.org/licenses/by-sa/3.0, via Wikimedia Commons

Why Lithium?

Lithium is a soft silvery white alkali metal. It is number 3 in the periodic table, so is a very small atom, which means that a lot of Li^+ ions can be stored in the cavities in the electrodes. This gives lithium-ion batteries their high energy density. The more Li^+ ions moving through the cell the higher the current flowing in the external circuit. And lithium has the lowest density of any metal: 1 cm^3 of lead weighs more than 21 times as much as 1 cm^3 of lithium, so Li-ion batteries will be *much* lighter than equally sized lead-acid batteries. Even so the battery pack of a Tesla Model S contains about 12 kg of lithium.

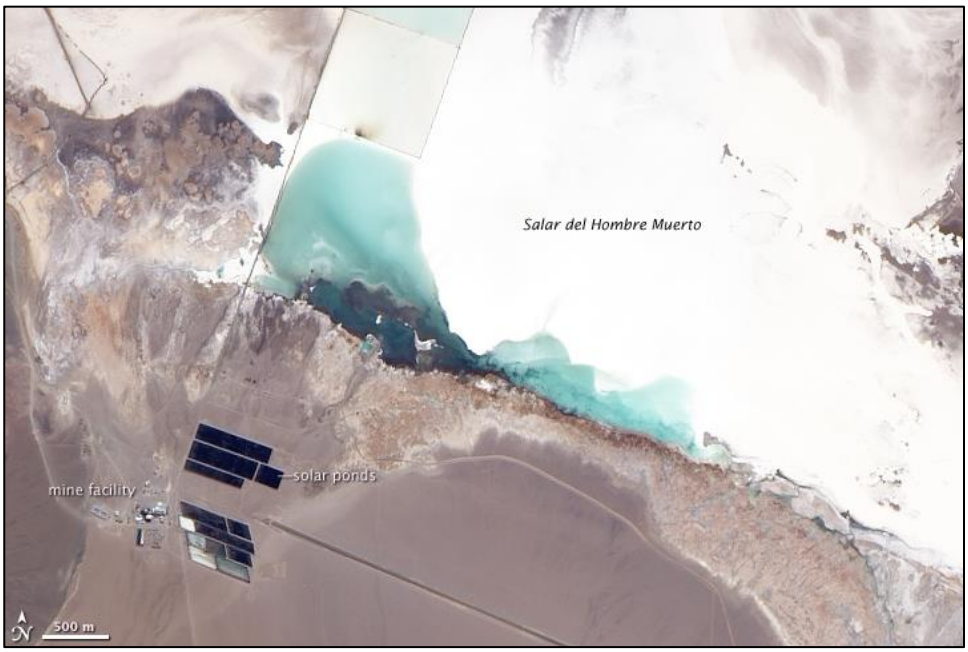
The high energy density of lithium means that a single cell can produce a voltage of 3.6 V, and the cell is smaller than the cells in a lead-acid battery, so more can easily be stacked to produce the higher voltage batteries needed by electric cars. And lithium is relatively common (the 25th most abundant element).

Environmental problems of lithium production

Lithium is so reactive that it is not found in elemental form. It is usually found in one of two states: as a solid ore that is mined, or dissolved as a salt in a brine that is evaporated.

Both of these can cause environmental disasters. In May 2016, hundreds of protestors threw dead fish onto the streets of Tagong, a town on the eastern edge of the Tibetan plateau. They came from the Liqi river, where a toxic chemical leak from the local hard-rock lithium mine had wreaked havoc with the local ecosystem. There are pictures of masses of dead fish on the surface of the stream, and eye-witness reports of cow and yak carcasses floating downstream, dead from drinking contaminated water. It was the third such incident in seven years. China has huge lithium reserves, but its enormous production of e-vehicle batteries means it is the world's largest consumer of lithium, importing over 50% of output of the hard rock mines of one of world's biggest producers (Australia).

The environmental impact of production of lithium from brines is also bad. Bolivia, north-west Argentina and northern Chile (Atacama Desert) are known as South America's "lithium triangle", with the world's biggest known lithium reserves, high up in the Andes Mountains. To extract lithium, miners drill a hole in salt flats and pump salty, mineral-rich brine to the surface. After several months the water evaporates, leaving a mixture of manganese, potassium, borax and lithium salts which is then filtered and placed into another evaporation pool. After between 12 and 18 months of this process, the mixture is filtered sufficiently that lithium carbonate can be extracted.



Part of Argentina's huge Salar del Hombre Muerto (Dead Man's Salt Flat), altitude 4000m, showing the solar evaporation ponds at bottom left.
By NASA Earth Observatory: earthobservatory.nasa.gov/IOTD/view.php?id=38729, Public Domain, commons.wikimedia.org/w/index.php?curid=6880252

This is one of the driest places on earth, better suited to astronomy than mining. In Chile's Salar de Atacama, mining activities consumed 65% of the region's water, which is having a large impact in an area where some communities have to get water driven in from elsewhere.

The landscape is marred by mountains of discarded salt and canals filled with contaminated water with an unnatural blue hue. There is the potential for toxic chemicals to leak from the evaporation pools into the water supply. These include hydrochloric acid, used in the processing of lithium, and waste products that are filtered out of the brine. Lithium extraction can also harm the soil and cause air contamination.

These are only a few examples of what is happening where lithium is mined. The countries mentioned so far are very distant, so both the UK and Europe are looking for their own economically viable sites for lithium mines. Cornwall is a possibility for the UK, and Poland and Portugal are already producing lithium. Dr. Thea Riofrancos, a political economist at Providence College in Rhode Island, US, pointed to growing trade protectionism and the recent US-China trade spat. (And that was before the trade row between China and Australia.) Whatever worries EU policymakers might have had before the pandemic, she said, "now they must be a million times higher".

Salt Flats near San Pedro de Atacama, Chile (photo:EE)

Salinas Grandes, Salta province, Argentina (photo: EE)

She continued "There's a fundamental question behind all this about the model of consumption and production that we now have, which is simply not sustainable. Everyone having an electric vehicle means an enormous amount of mining, refining and all the polluting activities that come with it."

Is recycling of batteries the answer?

Unfortunately not yet. Lithium cathodes degrade over time, so they cannot be placed into new batteries. There have been fires at recycling plants where lithium-ion batteries have been stored badly, or disguised as lead-acid batteries and put through a crusher! At the moment recycled cells are

usually shredded, creating a mixture of metal that can then be separated by burning, which wastes a lot of the lithium. And there is an additional economic factor in that it currently is more expensive to extract lithium by recycling than it is to mine fresh lithium!

Other problems

Lithium itself is light, but lithium batteries are quite heavy because the demand being made of them is substantial. The battery packs in electric cars with reasonably long operating ranges (more than 200 miles, which is not really very far) tend to weigh close to half a tonne. Many of these longer-range models weigh close to or more than two tonnes, so all too-often they are 'packaged' as 'small' SUVs. For example, the recently introduced Volkswagen ID.3 "family-sized" electric car is similar in size to a VW Golf, but the ID.3, despite not having a heavy fossil-fuel engine or multi-speed gearbox, weighs about 400 kg more than a petrol-powered Golf. Because of their weight, current electric cars also produce more particulate air pollution due to producing more dust from tyre wear than lighter cars.

Most electric cars seem to have similar efficiencies of about 3–4 miles per kWh of electricity. If we want cars that are more efficient they need to be lighter.

Another problem is charging time and the accompanying demand for electric power. To charge a 64 kWh battery pack to 80% capacity in, say, 20 minutes requires a power source of more than 150 kW. A cluster of 10 such charging points, all in use, requires 1.5 megawatts. That's a lot of power, enough for a village. So although there is research into faster charging (a project to charge lithium batteries in just five minutes is described at tinyurl.com/tsumtr4c), fast charging would require a lot of new power distribution infrastructure. Faster charging will inevitably cost more per unit of electricity

Finally, Li-ion batteries currently require the use of cobalt, often from the Democratic Republic of Congo and mined under conditions that violate human rights. The ultimate aim is to use less cobalt or none at all. "It's rare (i.e. expensive), hard to mine and often mined unethically, so it makes sense that Tesla is looking to eliminate cobalt from its batteries. Tesla already uses far less than many competitors, but Musk says Tesla will now stop using cobalt all together." See tinyurl.com/29vecb7a and/or tinyurl.com/a3w98ec9.

Sources of information for this article include:

Australian Academy of sciences: **Lithium-ion batteries.** Scroll down to the bottom of page for three more articles: How batteries work, Types of batteries and Batteries of the future. bit.ly/2OJyoTk

The Observer: **Child labour, toxic leaks: the price we could pay for a greener future.** Robin McKie, Science Editor. Sunday 3 Jan 2021. bit.ly/3dPN7Vc

Wired on Energy: **The spiralling environmental cost of our lithium battery addiction**. Amit Katwala, 5 Aug 2018. bit.ly/329yq9S

BBC News: **Protecting fragile ecosystems from lithium mining**. Michael Winrow. 15 Jan 2021 bbc.co.uk/news/business-54900418

Top six lithium-producing countries in the world. NS ENERGY Staff writer. 23 Nov 2020. bit.ly/3s8LyH7

Top six countries with the largest lithium reserves in the world. NS ENERGY Andrew Fawthrop, 19 Nov 2020. bit.ly/3g2QFGw

The Guardian: **The curse of 'white oil': electric vehicles' dirty secret**. Oliver Balch, 8 Dec 2020 bit.ly/3a434G7

* * * * *

The Sustainable Blewbury newsletter is produced and edited by Jo Lakeland and Eric Eisenhandler.
We would be delighted to be able to include more articles written by **YOU** in this newsletter.

In more normal times we have a wide-ranging programme of activities in and around the village. Participating is fun and can make a positive contribution to village life and the local environment. If you'd like to get involved, or to receive this free bimonthly Newsletter, email us at info@sustainable-blewbury.org.uk or phone John at 01235 850372 or Jo at 01235 850490.