

## Environmental Waste Management Group Webinar – 25 August - Responses to Questions

Question	Answer by ERM group	Answer by Andy Latham @salvagewire.com
What do you do with compressed gas powered vehicles	We don't see that many of these vehicles. We do however deal with Liquid Petroleum Gas (LPG) or Compressed Natural Gas (CNG) powered vehicles, which are dealt with in the same way as other ELV's, with the exception that the gas fuel tank is removed from the vehicle and then sent for draining and disposal	Not relevant question, dismissed.
For EV to be successful, recycling of batteries is of paramount importance. Many questions for this subject: What % of current batteries can be recycled? What measures are possible to improve this in future? Is there sufficient capacity and resource availability to switch from fossil fuel to EV on a global scale	We are expecting that once our processes are delivered we will be able to recycle 80% of materials in batteries. We do believe there is, but re-use and recycling will be essential in the long-term as resources are finite.	If the whole vehicle parc switched today from ICE to EV, no, but this is going to be a long-term switch over and legislation is driving investment into this area so when significant numbers of batteries start reaching end of life the recycling facilities will be up to speed and able to cope. Currently 75% of every high voltage battery can be recycled, this can only improve as more investment comes into the sector, and if every household or industrial battery was recycled (currently less than 40% of all household batteries are recycled) then the reliance on rare earth metals would be significantly reduced!
These battery on the electrical vehicles are known to catch fire. What do you have in place to fight any fire from the battery	We are currently developing our emergency procedures in collaborations with the Health & Safety Executive.	As outlined, 1,000's of litres of water or the vehicle fire blanket that gives a solution that is easy to use, doesn't need any water and is environmentally friendly - <a href="https://vehiclefireblanket.com">https://vehiclefireblanket.com</a>
How and where are you storing EV batteries, those that are damaged and undamaged?	Live answered	Store these batteries in a location with restricted access, keep the batteries dry, keep the chemistries separate and make sure the batteries cannot fall on anything or have anything fall on them.
What happens with the removed pollutants from batteries? Is there assurances that these don't enter and pollute the natural environment?	Live answered	Live answered
Does the lifespan dictate the recycling method of the ev battery?	It is not so much lifespan that dictates the recycling method, more chemistry of battery. Different chemistries require segregation for recycling.	Most batteries last beyond the lifetime of the vehicle, so the ideal outcome is that these batteries go into second use applications (static storage for wind farms, solar farms etc), this is still in pilot stages so expect this to scale up over the next few years
Are you looking at EV battery re-use as storage for other charging purposes e.g. second-life lithium-ion batteries for PV storage purposes	Yes we are. There are lots of second life opportunities for EV storage, grid stabilisation and strengthening the grid for EV charging at a local level.	See answer above

After removing the battery, are there operations who are able to compliantly dispose of the batteries or hopefully recover and recycle the battery materials?	Yes, that is the process that we are developing at the moment and we aim to have it working across the UK in the next 2 to 3 years.	See answer(s) above
What procedures do you have in place in the event of a Li-Ion battery going into distress(failure) - do you have a quarantine procedure and conduct thermal checks on the batteries	We are still working on the detail of the procedures on this with input from others in the industry and the Health & Safety Executive.	This is best practice - in reality, very few vehicle dismantlers/recyclers are doing this
Have you needed to set up any quarantine areas with fire separation for EVs awaiting de-polluting?	We are still working on the detail of the procedures on this with input from others in the industry and the Health & Safety Executive.	Best practice is to set these vehicles aside into a specialist area prior to de-energisation and depollution - EMR are doing this.
Does the battery waste management process in EMR conforms with the provision of R2:2013 (Responsible Recycling).	At EMR we follow all UK management regulations, as well as, ISO 9001 140001 45001 and end of waste certifications.	
how are EV batteries recycled?	That is a big topic. Some of the processes are confidential. In a nutshell, they are shredded in inert atmosphere and then materials are mechanically separated before being processed further in sophisticated recovery processes.	Two processes, hydrometallurgy or pyrometallurgy - one uses water the other uses fire, both processes have advantages and disadvantages and neither is yet perfect, but investment is continuous and these will develop or another process will come into use int the future
Is there a globally accepted legal requirement regulating the use of electric vehicles, and does it override the environmental requirement of the country where the electric vehicle is being used.	There is no global standard, we are following UK/EU regulations.	No, there are some around vehicle design and construction but nothing globally about use, repair, recycling etc.
Just curious to know as to what are the key challenges in eco-friendly battery recycling process? Is there a scope of circular economy concept with battery recycling and future battery generation process ?	The key challenges are safety and maximising yield the of useful materials. We are totally committed to the circular economy concept and expect to see our recovered materials going back into new batteries.	You have to remember that this is a very young industry that is still learning, growing and developing, there is lots of scope, plenty of ideas and lots happening, but this cannot occur overnight. Ideally we have a solution that is similar to lead Acid batteries where 99% of every battery is recycled and all the components re-used - we are at around 75% currently and this can only get better, but it will take investment and also needs to be cost effective against 'virgin' material.
Why is there no standardisation of big orange swich this would definitely be a big help with safety of working on this type of vehicle	I would counter with isn't the fact all EVs have a big orange switch 'Standardisation" ? The location will be design like all vehicles. I think EVs are pretty standard already, compared to ICE 80 years ago.	Oh I wish! No, many different designs, locations and processes - some vehicles (BMW, M-B, VAG Group and Stellantis) do not have an orange switch!

Is there a way of discharging the EV battery prior to dismantling?	Yes, that is part of our procedure.	This can be done, but with extreme care. Most EV batteries are designed to work between 20 and 80% of charge (even if it shows 0-100% on the instrument pack) and discharging below this threshold will damage the battery beyond repair - putting it into an instable condition and seriously increasing risk of fire.
Are there any standard processes for discharging any inductance/capacitance/resistance (LCR) circuits in the car after a battery has been disconnected?	We are currently developing those techniques with our partners.	All vehicle manufacturers state that there should be a wait time for any capacitors to discharge as the vehicle is being shut down, this varies from 2 minutes to 10 minutes; all of the training Salvage Wire provides state 10 minutes because no manufacturer has gone higher than that and it is easy to remember
Are there training in place for users for them to be aware of the risk associated with the electric hybrid vehicles and steps to take to mitigate the risks?	Once we have developed our safe working guidelines in collaboration with the Health & Safety Executive over the next couple of years, we plan to share key points with the wider EV community so that everyone can benefit.	The current accredited training available is for technical teams and employees - I am not aware of anything for owners/drivers of the vehicles unless they are employees and using the vehicles for work.
Could the risk be reduced by discharging the battery before processing?	Yes - that is what we typically do.	As previous answer - possible but be careful how far the battery is discharged as it could become unstable
Andy, in your professional opinion - knowing the hazards with EVs (certainly in a car accident), why is the car industry and government still pushing to go electric?		The only way we can reduce our output of harmful gases is to use Zero Emission vehicles - at the moment Electric is the only viable option, but hydrogen could become an alternative if it is 'green' hydrogen and the refuelling infrastructure is available.
Andy, how would you store a damaged battery before it can be removed from site? 6m gap etc?		Secure storage area, keep it dry, and if damaged keep it under a fire blanket
What are the precautions, training and equipment that are needed by companies with vehicle fleets to protect against the possibility of fire?		I think the biggest risks here is how the fleets are managed - a car fleet where the vehicles are with the driver every night is one aspect that has low risk, but fleets that return to depot daily and charge overnight will have a much higher risk. Basic housekeeping such as regular checks of chargers and charge cables would be required, fire detection systems and rapid response could be another, and vehicle fire blankets available to be quickly deployed and prevent a major incident to the building - all of this will be user specific and depends on the size of the fleet, the type of vehicles, and the location all need to be part of any risk assessment.
Hello Andy, are there some specific fire fighting technique trainings that Electric car drivers can get certified, to prepare them of this potential fire challenge?		There is no specific training for vehicle drivers for this scenario, and I do not believe that many vehicle drivers would know what to do if their current car caught fire! There is training available for first responders - see <a href="https://eintac.com/course/imi-level-2-award-in-electric-hybrid-vehicle-hazard-management/">https://eintac.com/course/imi-level-2-award-in-electric-hybrid-vehicle-hazard-management/</a>

<p>How volatile is a burning battery under a vehicle fire blanket? Is it likely to explode?</p>		<p>Explosion is a risk. Any battery that is alight is volatile, the blanket prevents the fire from spreading to adjacent vehicles/buildings, stops the smoke from the battery that has serious pollutants in it, and means the vehicle will burn out underneath without the need for 10,000 litres of water - and the blanket can then be cleaned off, dried and put back into its bag ready for the next use</p>
<p>Excellent presentation Andy, considering the chemical and electrical properties of the batteries, do you think the use of water in extinguishing the EV fire will not further increase the risk of managing the disaster and increase environmental pollution and unsafe human exposure?</p>		<p>No - this has been proved many times to be the best way to put out the fire and reduce the temperature to prevent further ignition. In some cases I have seen the vehicle being put into a container full of water before being removed from the scene. Also, if an electric or hybrid vehicle is involved in a flood incident it will not energise the water it is in. However, do you want to waste valuable water resources? Put a blanket over it!</p>