Repurposing Modern EV Batteries: From automotive to stationary applications

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Aim of the Project

The Aim of the Project is to investigate the lifecycle of modern EV batteries and evaluate sustainable repurposing opportunities in other industries

Objectives

- Carry out critical literature review
- Conduct interviews and questionnaires
- Research other industries where they have been repurposed
- Design a possible contained BESS

Background

The increasing adaptation of electric vehicles has led to a rise in battery disposal challenges. This presents the issue of discarding of the large EV battery. The most common type of battery in an EV, is a lithium-ion battery. These batteries can store a large amount of energy, up to 80Kwh in some models.

Figure 1: BESS comprised of EV batteries

Repurposing batteries allows for a second life application from the automotive industry. This can bridge the gap between recycling and remanufacturing the battery. As the EV battery ages, it degrades over time, but the battery can still provide sufficient charge for use in a stationary BESS where there is less strain on the cells.

Figure 2 :Removed EV battery

Methodology

- **Literature Review** provided insights on EV types, battery types, technical viability and lifecycle assessment
- **Surveys** with structured questions for leading vehicle dismantlers which focused on EV's highlighted practical barriers
- **Interviews** with largest car dismantler in Ireland and an energy company on possible options presented possible opportunities
- **Case Studies** revealed real world examples of successful applications.

Result

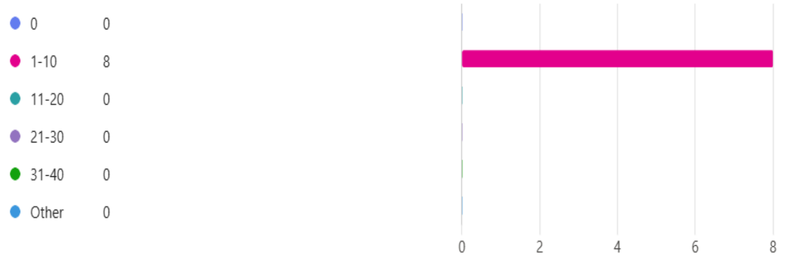

Figure 3 : EV batteries sold

In the survey, when dismantlers were asked how many batteries they has sold in the past year, all respondents had only sold between 1 – 10 batteries.

The risks that were identified with processing electric vehicles by the dismantlers were grouped into the categories in figure 3. The main risks identified included, fire, electrocution, explosion, disconnection and storage. The risk of fire was also identified by the director of F4 energy.

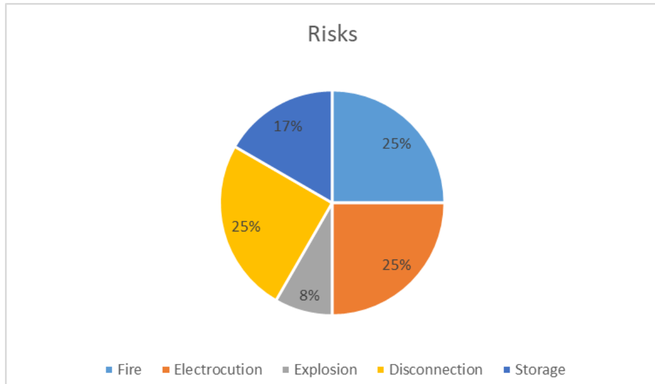

Figure 4 : Risk involved in processing batteries

Conclusion

EV's have become apart of the way we live, repurposing the batteries is one of the best methods for making the batteries more sustainable. Whit this technology paired with the renewable energy sector, their applications become limitless. As stated in the city of Phoenix, 1.9 tons of Co2 was spared by using repurposed batteries. With the batteries repurposed the are lots of second life applications where they can be used.

- Back up power supplies for when the power is out.
- Battery Energy Storage System for remote working conditions.
- Storing energy created from renewables such as solar and wind when there is little demand.

Model of BESS

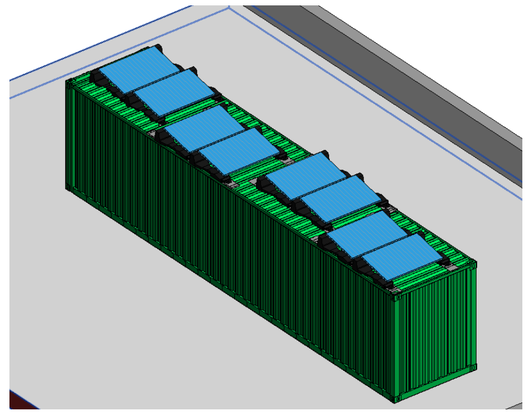

Figure 5 : Model of BESS

The above image shows the proposed conceptual model of the contained EV batteries with solar panels for remote conditions