

Final Year Project Interim Report



**University of
Sheffield**

Implamenting adaptive multistage constant-current charging in lithium based batterys to reduce degradation

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1 Introduction

There are currently over 7 billion people with access to electricity [1], the global consumption of energy is rising by 4.5×10^{16} Joules every year; 77% of which is from utilising non-renewable sources. With the affects of non-renewables on the environment still not fully realised, coupled with the concern of their finite-life nature, poses a constant need to increase usage of renewables. However, a large set of renewable generation methods fall under the category of variable renewable energy (VRE) sources [2], thus requiring a robust form of energy storage to solve the intermittent availability of these energy sources - methods of storage do exist and suitable solutions do depend on the specifics, as battery technology increases, the use of battery in the field are ever more increasing. There is also the rapid increase in electric vehicle production, with a push to increase the adoption of EV's, 17.3 million cars were produced in 2024 [3] with a recent 20% average year-on increase. Lithium Ion batteries (LIB) are the most common batteries used in modern day due to their desirable characteristics in energy density, aging properties and more.

EV's and the energy sector account now account for 90% of the total lithium ion battery demand since 2016, the total lithium-ion battery demand is 10-times larger [2] since 2016. Different resources predict different forecasts of total battery growth [4, 5], yet it appears the rate of demand will not be decreasing in the near future.

LIB's as an energy storage medium age over time, and decrease until deemed 'dead'. This means that all LIBs currently in use will eventually be either repurposed

Briefly discuss efforts & applications to mitigate

What is this project? the general approach

1.1 Project Aims

1.1.1 Objectives

- Reduce

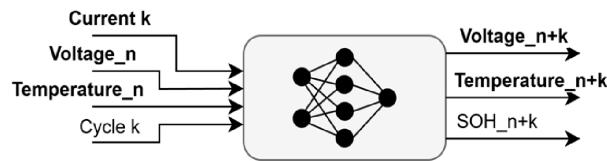


Figure 1: Initial end objective: Black Box Battery

2 Project progress

3 Literature Review

3.1 Lithium based batteries

Whiney well ¹

3.2 Neural networking

3.3 Optimal control

4 Plans for Remaining Work

5 Self Review

¹Yep soooo

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