**Project Scope:**

Shifting from traditional fossil fuels to clean energy is critical for mitigating climate change towards a sustainable society. The practical utilisation of clean energy relies on not only the performance but also the cost of energy storage devices. This project aims to develop high-performance and low-cost Na- and K-ion batteries employing hard carbon as an advanced electrode. Compared to Li-ion batteries, the Na and K counterparts possess the advantages in sustainability due to the natural abundance of Na and K resources, making them promising candidates for stationary energy storage. To reduce the fabrication cost, biomass waste will be adopted as a precursor to prepare the carbon electrode. The specific effect of the individual constituent in biomass, such as lignin and cellulose, on the carbon formation will be explored to guide the selection and manufacture procedures of biomass for turning the waste into treasure. Successful implementation of this project will bring two-fold benefits: on the one hand, pushing forward the wide usage of clean energy; on the other hand, alleviating the burden of municipal solid waste on the valuable landfill space through recycling biomass waste.

**Summary of the Findings/Outcomes:**

To be available upon completion of the project