Urban Pathways

Second-life Electric Vehicle (EV) batteries for solar energy storage in Alicedale, South Africa

Participants and roles

1. NMU (research partner-local partner) will act as the local living lab facilitator.
2. CENEX NL (Knowledge partner- support design and implementation) BIF will deploy InfoSpots with local partners, fostering the knowledge on energy.
3. Local SMEs will be incorporated into the provision of the technology solutions

Context, motivation and objectives

South Africa has an enormous potential for solar energy generation and its photovoltaic (PV) and energy storage equipment industry is developing fast. Second life batteries from EVs - that retain 70-80% of their initial capacity - have a good potential to be embedded into static storage of renewable energy in both grid and off-grid systems, and while their deployments are limited, they are slowly growing. As electric mobility is progressing in South Africa, the inclusion of renewable energy and zero emission mobility provides a holistic solution to sustainable community development through energy production, storage and use, while also providing inclusion of the circular economy.

Challenge

1. Increasing energy and mobility access, and their affordability
2. Meet the performance standards for energy storage within circular economy applications
3. Provide a cost-effective alternative within energy storage options, prove the affordability of the concept

Innovative approach and contribution to the project

This demonstration aims to test, validate and replicate a **containerized off-grid renewable energy system comprising solar PV panels and second life EV batteries for stationary energy storage.** Key dimensions:

1 extending the productive use of renewable energy also to charge a small fleet of micro utility EVs (link to mobility decarbonisation) and understand the technical and commercial feasibility, performance, and replicability of the system for rural and peri-urban applications in South Africa and across the African continent
2 understand performance, value and repurposing potential of EV batteries

Expected results

1. GHG reductions by extending the life cycle of electric vehicle batteries into stationary storage applications
2. Anticipated financial benefits and improved affordability; proof of concept (operational, financial)
3. Coupling of electric mobility within renewable energy systems to increase productive use of energy

Sustainability, replicability

1. Off-grid applications relevant to rural areas lacking energy infrastructure and facing energy poverty; grid-connected systems in both rural and urban contexts to offer a grid balancing solution
2. Easily replicable solution for many geographies within Africa and developing countries
3. Scalable solution to higher generation and storage capacities to meet the energy demand of each use case

Expected impacts

1. Technical: demonstrating a technically viable off-grid solution for renewable energy generation, storage and use with electric mobility integration; with inclusions of circular economy and energy efficiency
2. Environmental: enhancing the environmental performance of energy storage systems, reducing waste generation by repurposing valuable products into different energy applications, reducing risk of resource scarcity for battery production
3. Socio-economic: improving energy and mobility access, development of rural areas also applicable to urban context, second life market to enable affordable energy storage, creation of new jobs and opportunities for local business
4. Contribution to the Sustainable Development Goals: sustainable and clean energy, sustainable cities and communities, climate action

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