

**NKOSITHANDILEB SOLAR**

# **Bidirectional charging of photovoltaic containers for drone stations**



## Overview

---

The future of urban drone-based transportation and delivery depends upon the efficient operation of its charging infrastructure. Working against gravity draws substantial energy from the drone's battery, requi.

Can building-integrated photovoltaics and UAV recharging stations reduce energy consumption?

Upgrading these building envelopes by deploying building-integrated photovoltaics (BIPV) and allocating UAV recharging stations on their roofs would represent a dual green solution. The environmental benefits of reducing energy consumption in upgraded buildings are coupled with generating clean electricity required for the UAV charging functions.

Are UAVs a good choice for Island photovoltaic charging stations?

Dang et al. (2021) propose a multi-criteria decision-making framework for island photovoltaic charging station site selection. While literature is abundant on ground vehicles and ships, UAVs have had less share of this focus. Compared to ground vehicles, the average UAV range is 3 km, which is significantly lower.

Are UAVs fully charged when they leave the charging station?

UAVs are assumed fully charged when they leave the charging station (SoC=100%). The UAV's flight range is estimated according to the UAV 3D minimal energy trajectory model. As the energy consumption rate varies for loaded and unloaded UAVs, two different flight scenarios are implemented.

How much power does a UAV use per charge stop?

Under this strategy, UAV charging power levels per charge stop vary greatly, 0.03-0.15 kW per vehicle, depending on the trajectory and SoC, but are still in line with that of current off-shelf UAV technology. Fig. 7.

## Bidirectional charging of photovoltaic containers for drone stations

---

Upgrading these building envelopes by deploying building-integrated photovoltaics (BIPV) and allocating UAV recharging stations on their roofs would represent a dual green solution. The environmental benefits of reducing energy consumption in upgraded buildings are coupled with generating clean electricity required for the UAV charging functions.

Dang et al. (2021) propose a multi-criteria decision-making framework for island photovoltaic charging station site selection. While literature is abundant on ground vehicles and ships, UAVs have had less share of this focus. Compared to ground vehicles, the average UAV range is 3 km, which is significantly lower.

UAVs are assumed fully charged when they leave the charging station (SoC=100%). The UAV's flight range is estimated according to the UAV 3D minimal energy trajectory model. As the energy consumption rate varies for loaded and unloaded UAVs, two different flight scenarios are implemented.

Under this strategy, UAV charging power levels per charge stop vary greatly, 0.03-0.15 kW per vehicle, depending on the trajectory and SoC, but are still in line with that of current off-shelf UAV technology. Fig. 7.

The wired charging or battery-swapping method requires a large number of people or machines moving around the pad, creating obstructions for drones during landing and takeoff. In this ...

Abstract--This letter introduces a photovoltaic (PV)-battery wireless charger tailored for unmanned aerial vehicles (UAVs), enabling seamless automatic charging. Sharing the ...

Bidirectional Wireless System for drone to drone opportunity charging in a multi agent system , IEEE Conference Publication , IEEE Xplore

ELECTRIC CARS AS ROLLING CHARGING STATIONS: In the "ROLLEN" research project, Fraunhofer IFAM and its partners have shown how ...

To address these problems, an innovative Building Integrated Photovoltaic (BIPV) structure with wireless drone charging capabilities is designed to optimize the usage of rooftop ...

The model addresses the intertwined UAV en-route charging, GHG emissions elimination, flight policies, solar energy harnessing, and kinematic-based 3D optimal trajectory ...

ELECTRIC CARS AS ROLLING CHARGING STATIONS: In the "ROLLEN" research project, Fraunhofer IFAM and its partners have shown how electric vehicles with bi-directional ...

This study endeavors to tackle this critical issue through the development of an autonomous drone battery charging system. We propose the creation of an automated ...

The future is moving toward fully autonomous drone transportation-delivery systems. However, handling the charging of a large number of drones is still a pivotal problem ...

Request PDF , Building integrated photovoltaic powered wireless drone charging system , The future of urban drone-based transportation and delivery depends upon the ...

A Multi-Objective Optimization of Autonomous Drones' Solar Energy Charging Stations Utilizing BIPV Urban Upgrade 1 Mohamed ElSayed Moataz Mohamed McMaster ...

## Contact Us

---

For catalog requests, pricing, or partnerships, please contact:

### **NKOSITHANDILEB SOLAR**

Phone: +27-11-934-5771

Email: [info@nkosithandileb.co.za](mailto:info@nkosithandileb.co.za)

Website: <https://www.nkosithandileb.co.za>

*Scan QR code to visit our website:*

