

# SEED STUDIO DEVELOPS OPEN SOURCE EV CHARGING PRODUCT THANKS TO ZEPHYR RTOS AND LF ENERGY EVEREST

## CHALLENGE

Seeed Studio, a leading IoT hardware company, recognized the growing demand for an efficient and customizable open source electric vehicle (EV) charging solution. The challenge was to develop a product-ready solution that aligned with the evolving market needs, offering scalability, security, and adaptability for diverse applications.

## SOLUTION

Seeed Studio addressed this challenge by harnessing the power of the EVERest Project from LF Energy and the Zephyr Project. EVERest is an open source software stack for EV charging stations. By digitally abstracting the complexity of multiple standards and use cases, EVERest runs on any device, from unmanaged AC home chargers to complex multi-EVSE satellite public DC charging stations with battery and solar support. Zephyr is a small, real-time operating system for connected, resource-constrained, and embedded devices supporting multiple architectures.

These open source initiatives provided a robust foundation for the development of the reCharger project. Leveraging EVERest's energy management and grid integration focus, coupled with the Zephyr's real-time operating system for IoT devices, Seeed Studio created a modular and customizable solution.

## RESULT

The collaborative effort between Seeed Studio, EVERest, and Zephyr resulted in the reCharger, a product-ready open source EV charging solution. The reCharger project comprises the BeaglePlay charging host controller, the reCharger HMI touch panel, the BeagleConnect wireless sensor, and the reCharger analog board. The integration of these components ensures secure, compatible, and feature-rich customizable EV charging, with real-time monitoring capabilities and environmental sensors for a safer charging environment.



## CHALLENGES DURING DEPLOYMENT

The primary challenge, which is ongoing, is the competitive landscape in the Chinese charging market, with many closed suppliers. Overcoming this requires demonstrating the strategic and collaborative advantages of integrating with EVERest, showcasing the benefits beyond simply creating a cost-effective solution. Seeed is confident that the product will prove itself up to the task of providing a scalable, interoperable, efficient charging solution for EVs from all manufacturers.

## DEPLOYMENT STATUS

While the reCharger is not yet deployed in production, further integration with smart home and parking applications is underway. Developer interest is strong, and off-the-shelf dev kits will be available in 2024, marking the initial steps towards scaled deployment.

While specific metrics are pending, the project has garnered thousands of views, generating inquiries and interest. More quantifiable metrics are expected as dev kits become available and shipping commences.

## FUTURE PLANS

Seeed Studio is currently working on next generation hardware for an improved charging product leveraging EVERest and Zephyr. Seeed also envisions expanding the use of EVERest and Zephyr beyond EV charging. The focus is on integrating scenarios around Vehicle-to-Home (V2H) applications, providing open source subsystems for commercial-ready solutions in emerging markets. This will not only create new business opportunities, but help speed decarbonization and the energy transition in the Chinese and also global market.

### Learn more:

- EVERest - [lfenergy.org/projects/everest/](https://lfenergy.org/projects/everest/)
- Zephyr RTOS - [zephyrproject.org](https://zephyrproject.org)
- Seeed Studio reCharger - [seeedstudio.com/blog/2023/06/29/meet-recharger-a-future-proof-open-source-ev-charging-solution-at-eoss-2023/](https://seeedstudio.com/blog/2023/06/29/meet-recharger-a-future-proof-open-source-ev-charging-solution-at-eoss-2023/)