Case Studies

Enteligent

Enteligent TLCEV – Solar-Powered DC Charging with EVerest

Vision: Daytime Charging, Direct from the Sun

Enteligent, a California-based developer of smart solar optimization and charging technologies, set out to build the **world's first direct DC-coupled solar-powered EV charger**. Their TLCEV charger represents a paradigm shift: instead of routing solar power through multiple conversion steps, vehicles can be charged directly from the sun.

The benefits are clear: faster charging (up to **25 kW DC**, three times faster than AC Level 2), higher efficiency (up to **25% energy savings** by eliminating conversion losses), and resilience features such as **vehicle-to-home (V2H)** and **vehicle-to-grid (V2G)** integration.

Solution: Integrating EVerest for Reliability and Speed

To accelerate the development of TLCEV, Enteligent partnered with **Pionix** and chose to integrate **EVerest (LF Energy)**, supported by stabilizations contributed by Pionix. This marks the first time EVerest is commercially deployed inside a **solar-powered EVSE**.

With EVerest as the backbone, Enteligent gained:

- **Robust communication stack** supporting OCPP 1.6/2.0.1, ISO 15118-2/-20, Plug&Charge, and IEC 61851
- **Continuous testing and updates** coordinated with EV OEMs for maximum compatibility
- **Flexibility to release new features quickly**, from V2G functions to user-facing customizations
- A **low-risk development path**, reducing time-to-market for a first-of-its-kind solution

"PIONIX and EVerest have made what is typically one of the most difficult parts of developing an EVSE my lowest risk item,"
— Sean Burke, CEO and co-founder, Enteligent

Implementation: Reducing Risk, Accelerating Rollout

Enteligent's engineers focused on their unique hardware and power electronics, while Pionix ensured that the software stack remained stable, secure, and compliant. The collaboration enabled:

- Rapid prototyping of solar-to-vehicle charging flows
- Seamless integration of advanced standards into the TLCEV charger
- Streamlined testing against a wide range of EVs and charging scenarios
- A robust update mechanism for continuous feature delivery

Business Value: A Game Changer for the Energy Transition

The TLCEV charger demonstrates how **direct solar DC charging** can transform both the EV charging experience and grid dynamics:

- **Daytime charging** aligns EV use with peak solar generation, reducing fossil fuel reliance and grid strain.
- **Energy savings up to 25%** improve ROI for operators and end-users.
- **Scalable design** positions Enteligent to serve residential, fleet, and commercial applications.

"Enteligent's TLCEV charger has the potential to become a game changer in the energy transition. It enables EV users to fully utilize green overhead solar generation and thus reduce reliance on fossil fuels. Working together, we can speed up and simplify the transition towards e-mobility."
— Dr. Marco Möller, CEO, Pionix

Looking Ahead

With TLCEV entering the market, Enteligent and Pionix are exploring additional features:

- Expanding **V2H and V2G** capabilities
- Enhancing **analytics and diagnostics** for predictive maintenance
- Optimizing for **fleet and logistics depots** with high daytime solar generation

The Pionix Advantage in the Enteligent Case

- **Open-source foundation (EVerest)** guarantees interoperability and community-driven innovation
- **Pionix contributions** provide stabilization, testing, and integration know-how
- **Faster time-to-market** for a world-first product
- **Alignment with sustainability goals** by enabling direct solar charging