



EMPOWER YOUR EV
CHARGING THROUGH
ENTRUST SMART MICROGRID

Building the Future of Energy:

EnSmartEV & EnSmartV2H

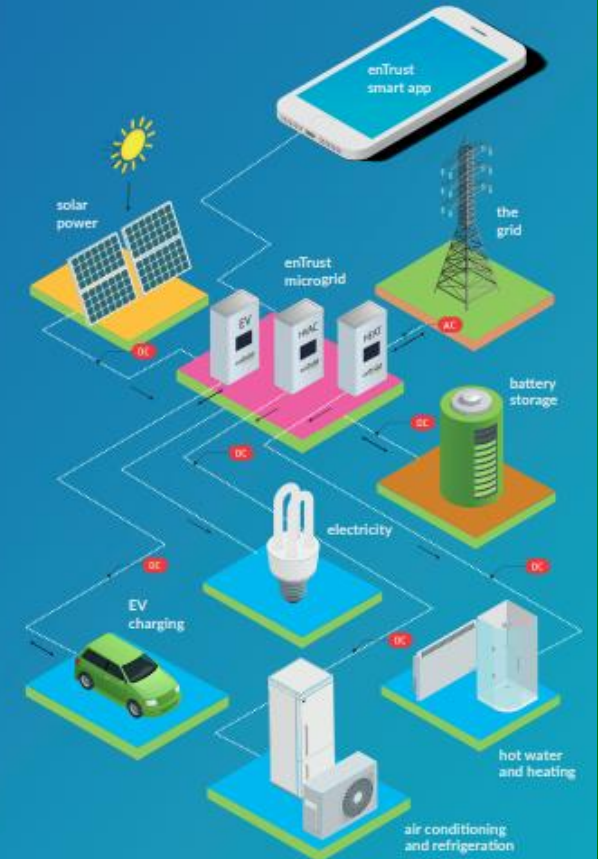
How Entrust Microgrid Bridges EVs, Homes, and the Grid

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Smart microgrid
technology
you can trust



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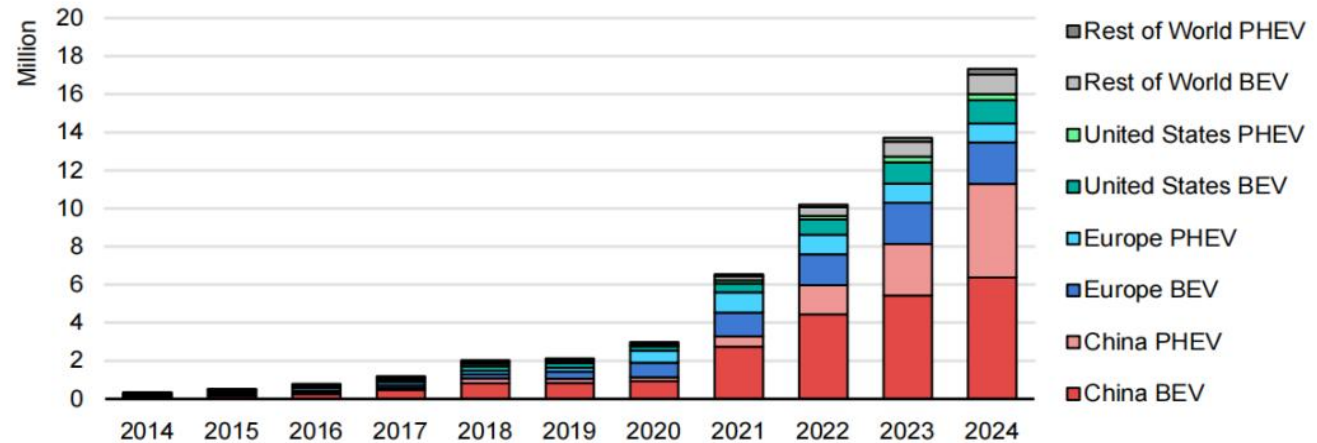
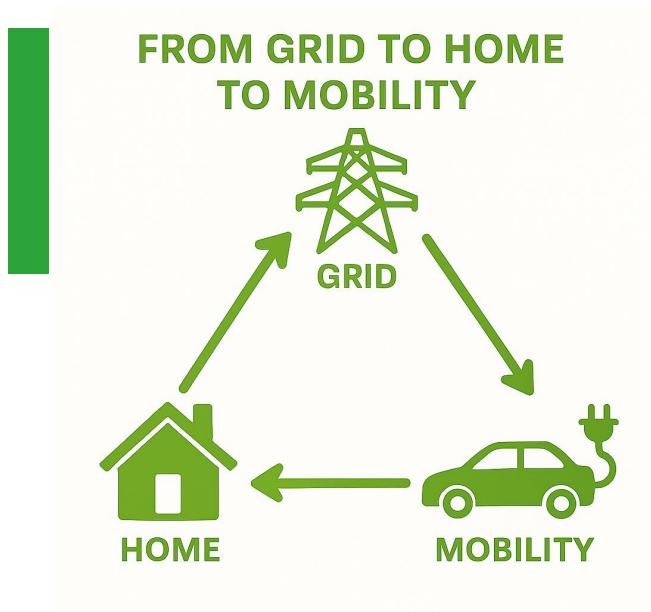


BUILDING THE FUTURE OF ENERGY



THE FUTURE OF ENERGY IS CONNECTED — BETWEEN MOBILITY, BUILDINGS, AND THE GRID.

In the near future, every EV will not only consume energy — it will power our homes and stabilize the grid.



IEA. CC BY 4.0.

Notes: BEV = battery electric vehicle; PHEV = plug-in hybrid vehicle. Includes new passenger cars only.
Sources: IEA analysis based on country submissions and data from the European Automobile Manufacturers Association (ACEA), European Alternative Fuels Observatory (EAFO), EV Volumes and Marklines.

- Net Zero 2050 goals driving electrification.
- 15 million EVs in Europe by 2030.
- Residential energy use shifting to flexible, distributed systems.

INDUSTRY PAIN POINTS

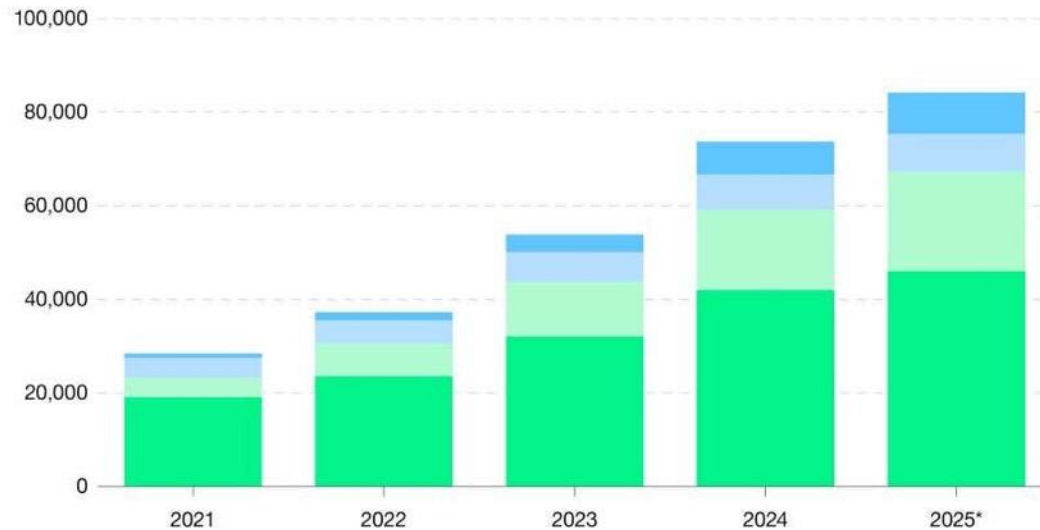
Challenges in Today's EV Charging Ecosystem

Rapid EV adoption is outpacing infrastructure readiness

- The number of public chargers in the UK has more than tripled since 2021, yet most new installations remain **below 50 kW**, unable to support next-generation EVs.
- High-power DC chargers (> 150 kW) still account for **less than 10 %** of total units.
- This imbalance causes congestion and longer waiting times, especially in cities and fleet depots.

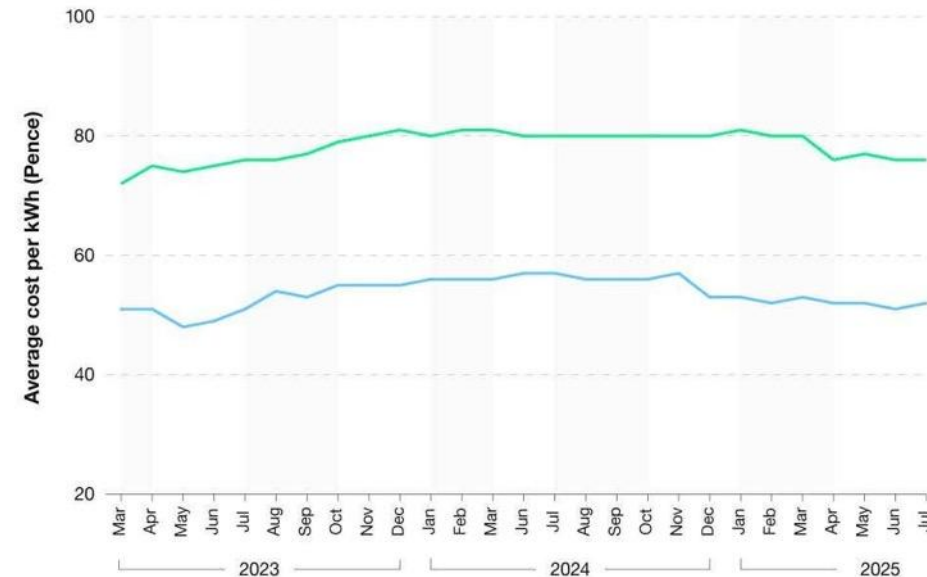
Number of public EV charging devices with a power rating:

● Below 8kWh ● Between 8–49kWh ● Between 50–149kWh ● Above 150kWh



Charging costs remain high and volatile

● Slow and fast chargers ● Rapid and ultra-rapid chargers



The Opportunity: Smart, flexible, grid-integrated EV charging

INDUSTRY PAIN POINTS

Rising Costs and Grid Connection Barriers

Very high public EV charging fees

- ✓ 44p/kWh (Supermarket) – 90p/kWh (Motorway)
- ✓ Cost remains 2× higher than home electricity tariff

Grid connection challenge for high-power DC chargers

- ✓ Lengthy approval process and high connection cost
- ✓ Network capacity limits in dense urban zones



INDUSTRY PAIN POINTS

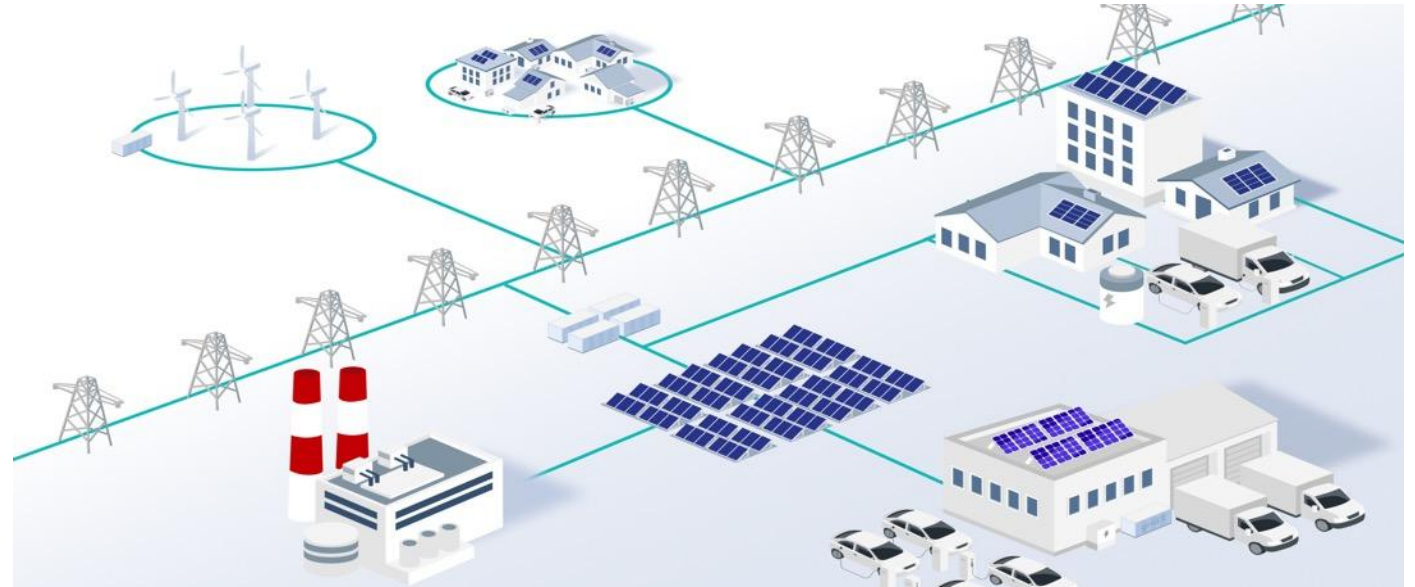
Network Congestion and the Need for Smart Flexibility

Network congestions caused by uncoordinated operations

- ✓ EV charging peaks coincide with BESS charging
- ✓ Flexible loads switch on simultaneously, creating local overload

What is needed for V2X (Home/Business/Grid) and X2G?

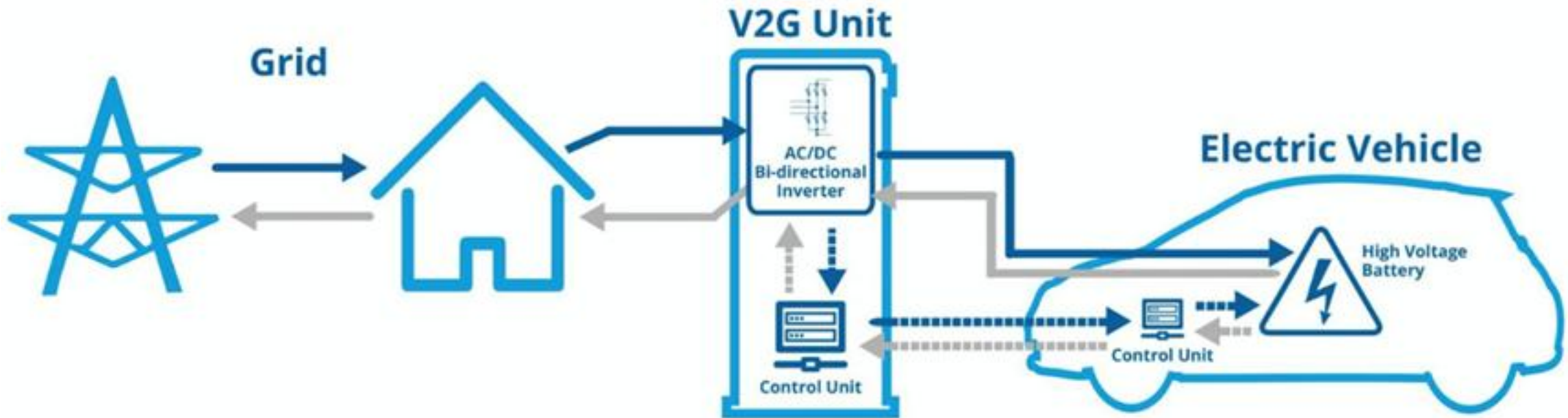
- ✓ EV battery reverse power flow for both AC and DC charging
- ✓ Smart Energy Management (EMS) to enable flexibility and balance



ENTRUST'S VISION

From EV Charging to Smart Energy Ecosystem

- Transform EVs from passive consumers into **active energy nodes**.
- Build a hybrid AC/DC microgrid for fast, flexible interaction.
- Enable "Energy as a Service" for users and utilities.



Reduced Cost. Increased Flexibility. Smarter Energy.

OUR SOLUTION OVERVIEW

EnSmartEV & EnSmartV2H System

- Smart DC/DC EV charger(s).
- Hybrid AC–DC Entrust Microgrid with BESS & PV.
- EnSmartEMS – Entrust Smart Energy Management System.



EnSmartEV – **SMART CHARGING HARDWARE**

Embedded within Entrust Smart Microgrid

Hybrid DC– and AC–networked power system enabling high efficiency and fast integration with:

- ✓ BESS (Battery Energy Storage System)
- ✓ Optional Solar PV
- ✓ Future-ready EV fleet operation

Reliable. Modular. Scalable.

Designed for flexibility across commercial and residential applications.



EnSmartV2H & EnSmartEMS: SMART ENERGY INTELLIGENCE

From Smart Charging to Smart Energy Ecosystem

EnSmartV2H – Vehicle-to-Home Integration

- ✓ Enables bi-directional energy flow between EVs, homes, and the grid
- ✓ Supports off-peak charging and peak-time power supply
- ✓ Provides resilience during outages

EnSmartEMS – Entrust Smart Energy Management System

- ✓ Enables bi-directional energy flow between EVs, homes, and the grid
- ✓ Supports off-peak charging and peak-time power supply
- ✓ Provides resilience during outages



Grid Connection Innovation

Fast and Low-Cost Grid Connection

Grid connection capacity reduced by ~75%

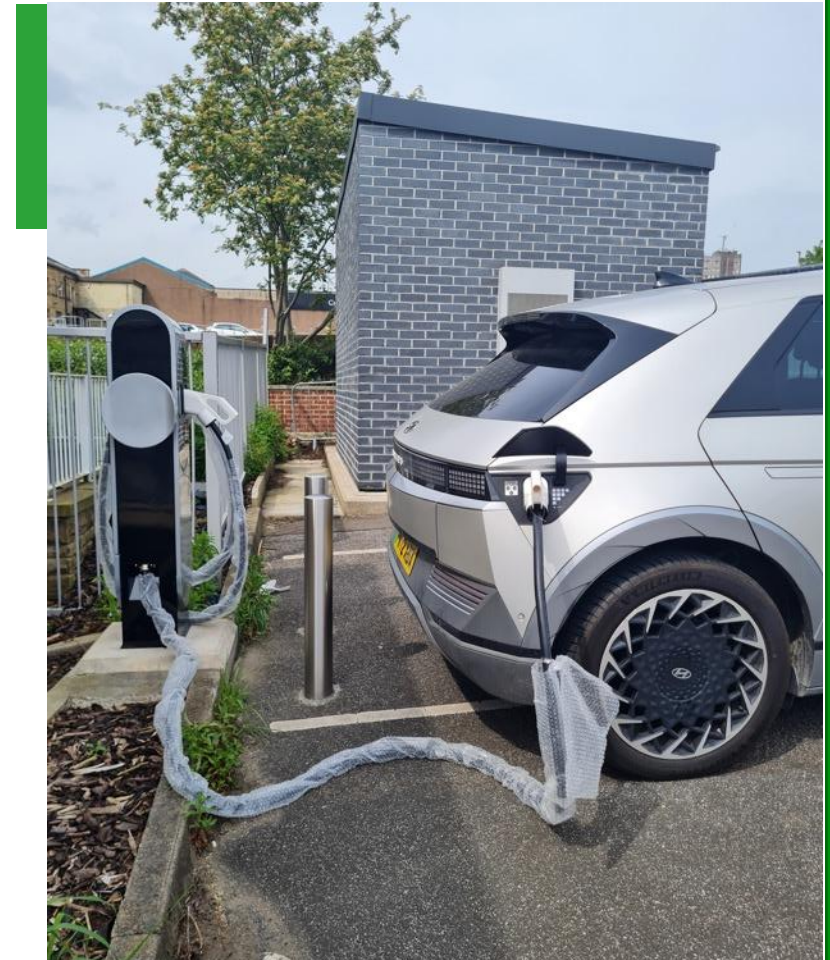
→ Smaller grid infrastructure required

Fast grid connection at low cost

→ Simplified approval and installation

Levelized power flows on the network

→ Improved system efficiency and reliability



EnSmartEV pilot site – reduced connection requirement by 75% (UK, 2025)

Energy Efficiency & Flexibility

Smarter Energy Use through Flexibility

Energy Flexibility

- ✓ Demand Side Response (DSR) and grid balancing services

Levelized Power Flows

- ✓ Enables smoother energy distribution
- ✓ Avoids grid congestion

Use of low-cost off-peak electricity

- ✓ Store energy during off-peak, use during peak demand

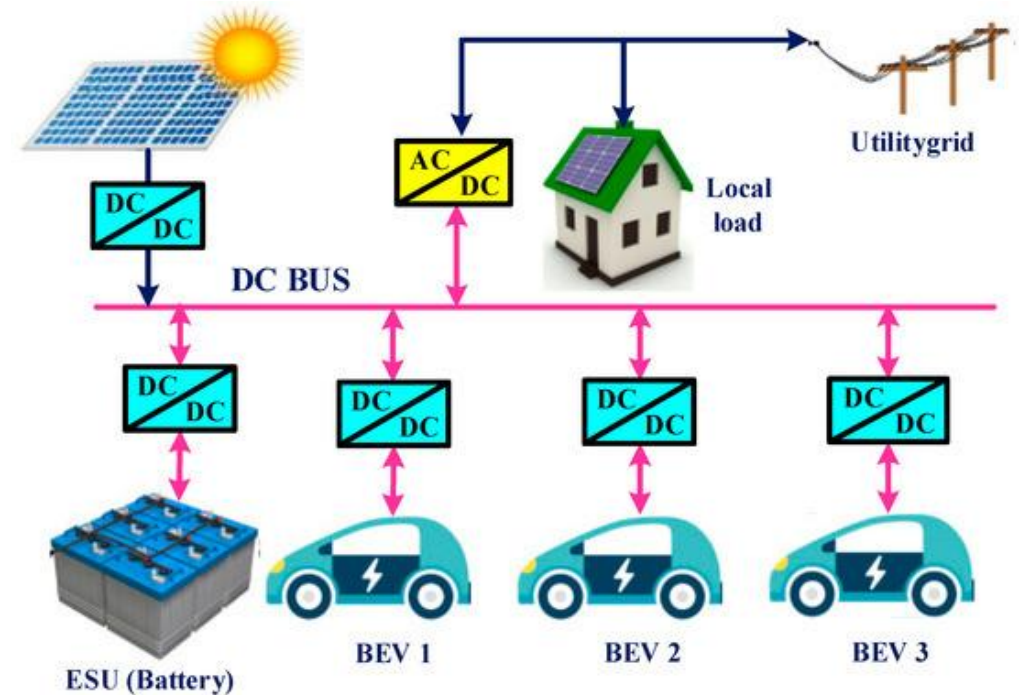


Real-world test site demonstrating EnSmartEMS flexibility control.

Direct Solar Integration

Maximizing Renewable Utilization

- Direct use of solar PV DC power for DC charging
 - Avoids multiple conversion losses
 - Achieves >95% charging efficiency
- Seamless integration with local PV arrays and BESS
- Enables carbon-neutral EV operation



Real-world test site demonstrating EnSmartEMS flexibility control.

Pilots across UK — from transport hubs to smart homes

Diverse Application Scenarios

Applications Across Sectors

Major Transport Hubs

→ Motorway service areas & rapid charging corridors

Fleet Operation Sites

→ Bus depots, logistics hubs, municipal fleets

Business / Retail Parks

→ EV charging + solar rooftops + energy storage

Residential & Smart Homes

→ V2H for backup and energy cost savings



Real-world test site demonstrating EnSmartEMS flexibility control.

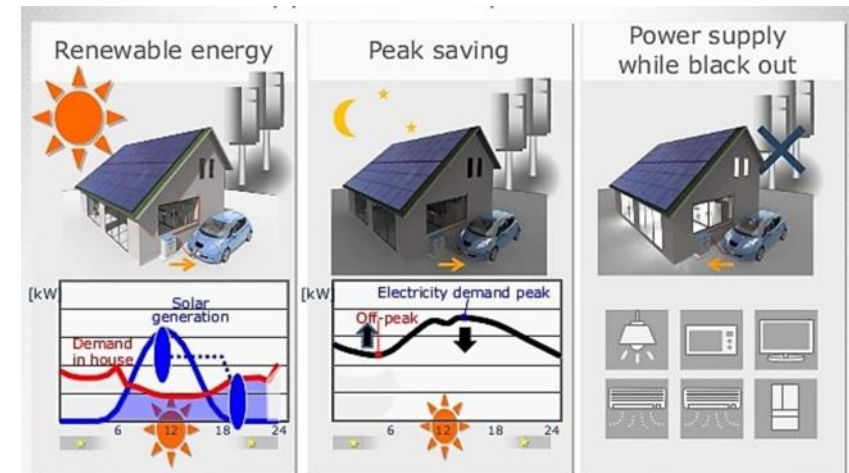
Case Studies and Home Integration

From Commercial Sites to Smart Homes

- **Fleet & Depot Use Case (UK Trial)**
 - Reduces grid demand by 40% during peak hours
 - Enables 20% energy cost savings
- **Residential Example (Solar + EnSmartV2H)**
 - Off-grid operation during blackouts
 - 100% renewable self-consumption



20% lower energy cost vs grid-only homes



Real-world test site demonstrating EnSmartEMS flexibility control.

Case Studies and Home Integration

From Household Energy Control to Virtual Power Plant

Smart Home Integration through EnSmartCTR & EnSmartCloud

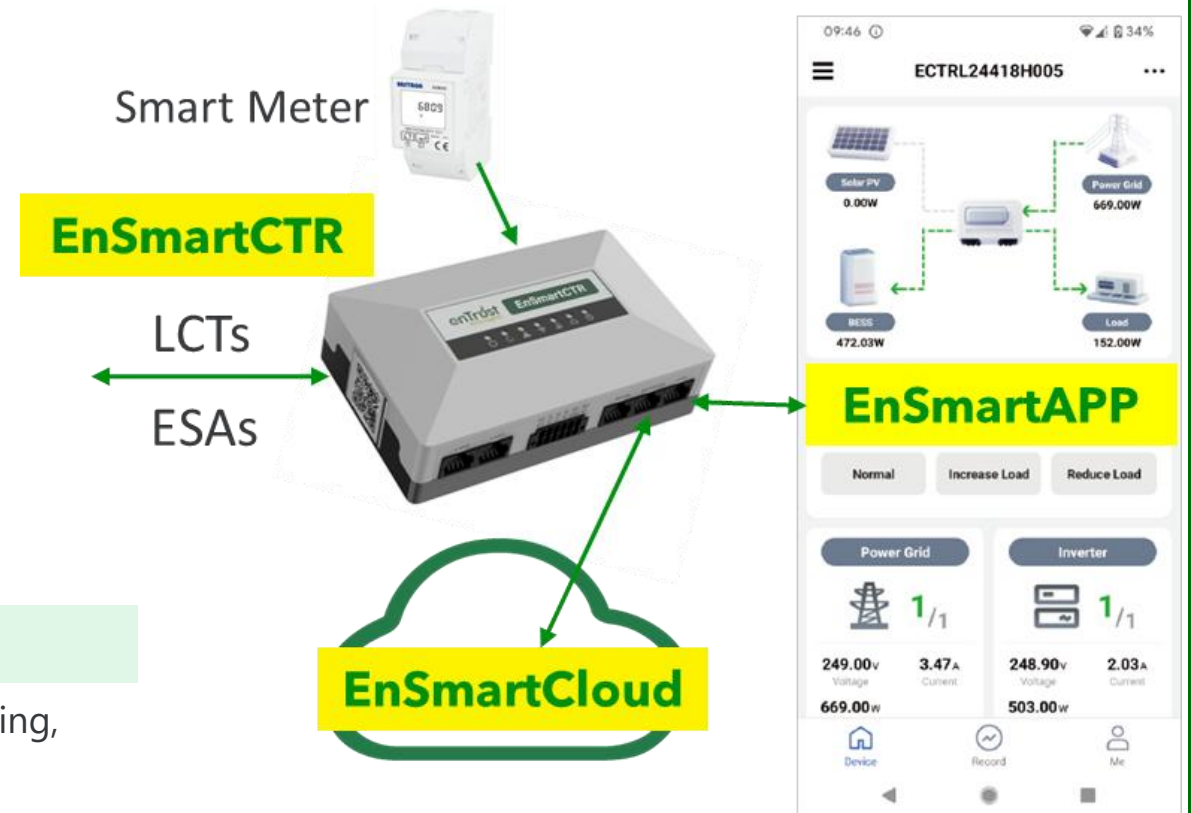
EnSmartCTR: Local controller integrating smart meter, LCTs & ESAs

EnSmartAPP: User interface for monitoring and load control

EnSmartCloud: Real-time cloud analytics and optimization engine

Home Energy Integration

Users can monitor household energy flow, solar generation, EV charging, and grid export from a single interface.

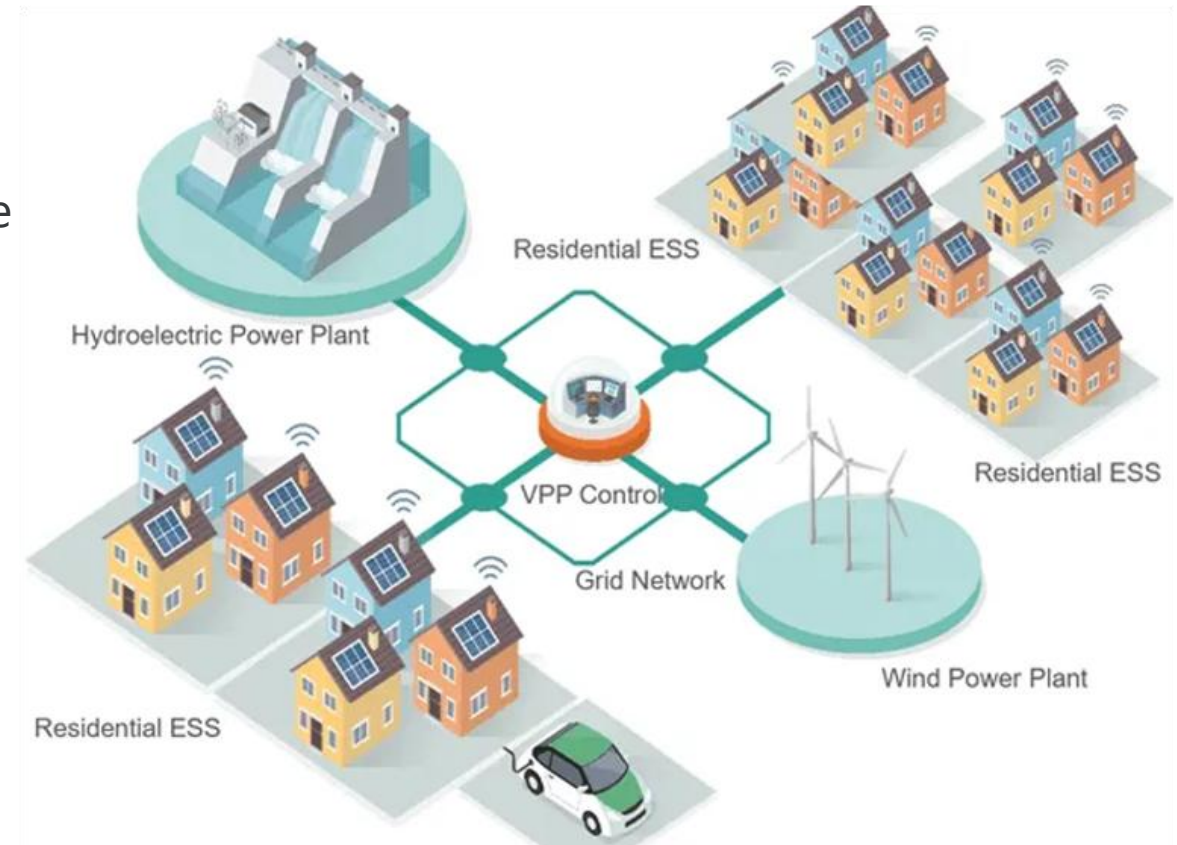


Case Studies and Home Integration

Connected Homes Form a Virtual Power Plant Ecosystem

Scaling Up to Virtual Power Plant (VPP)

- Each home with EnSmartCTR becomes a flexible energy node.
- Homes, solar PV, and ESS are aggregated by EnSmartCloud.
- Coordinated by **VPP Control** for:
 - ✓ Demand balancing
 - ✓ Renewable optimization
 - ✓ Grid services (DSR, flexibility markets)



VPP Integration

From a single smart home to a networked community — enabling real-time coordination between generation, storage, and consumption

Applications and Market Segments



Public & Transport Infrastructure

- Motorway & Road Service Hubs – Rapid DC charging with solar PV integration
- Park & Ride Facilities – Enable off-peak charging and flexible load balancing
- Fleet Depots / Bus Stations – Simplify high-power DC connection for electric fleets



Commercial & Business Zones

- Business Parks / Logistics Centres – Shared solar + storage microgrid for EV fleets
- Retail & Supermarkets – Co-locate energy storage with charging stations
- Hospitals & Universities – Resilient microgrid backup, energy self-sufficiency

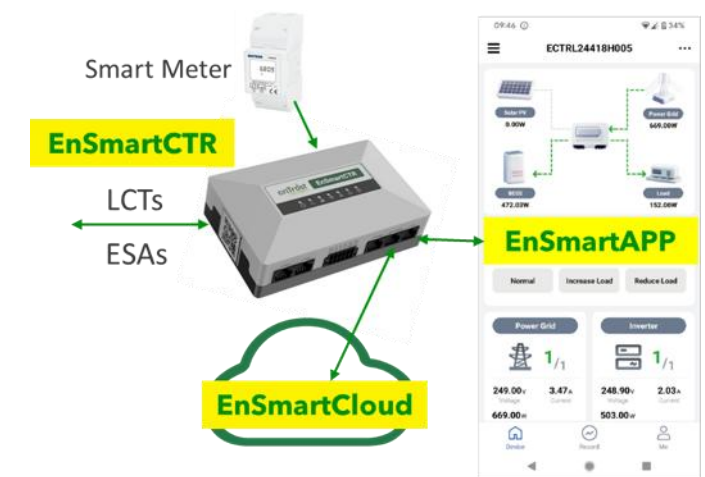
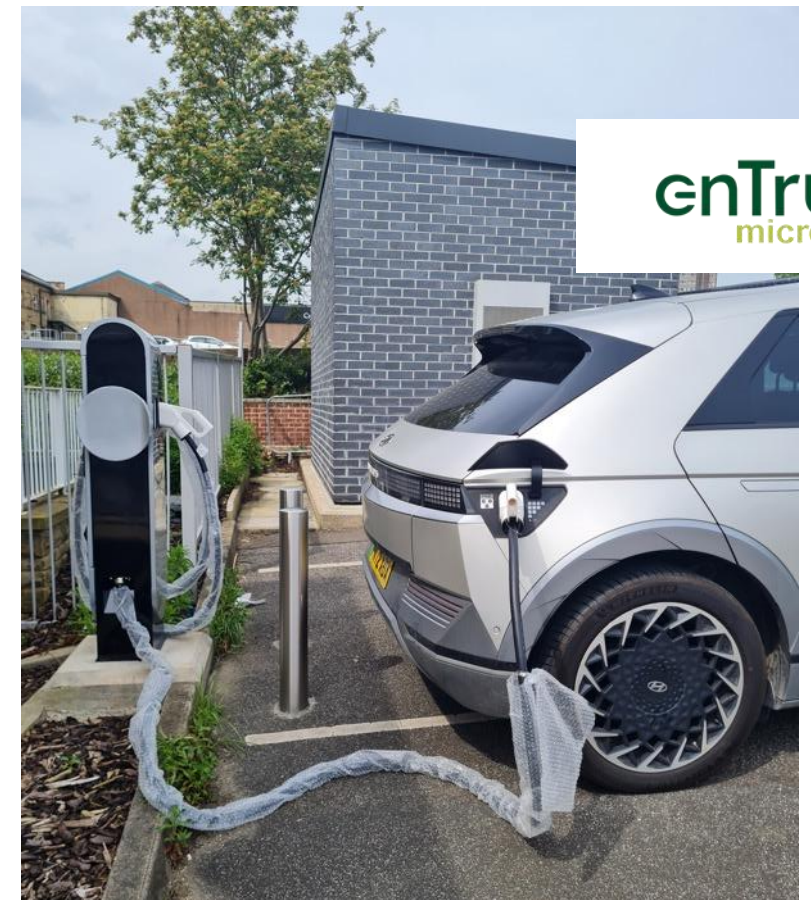


Residential & Community

- Homes & Apartments – EV-to-Home (V2H) energy support and cost optimization
- Residential Estates / Smart Communities – Aggregated VPP nodes with EnSmartEMS
- Tourism & Visitor Destinations – Smart charging in areas with grid constraints

Achievements & Plans

- ✓ **EnSmartEV Trials in the UK since early 2023**
 - **TRL 6+**
 - **TRL 7+ CE/UKCA certification 2026**
- ✓ **EnSmartV2H Prototype lab tested**
 - **TRL 4/5**
 - **Prototyping, testing and pilot demonstration 2026**
- ✓ **EnSmartEMS**
 - **TRL 6+**
 - **Ofgem NIC / NPg CDSO with Ricardo & HNZ**
 - **Eurogia2030 DEMFLEX**
 - **CE/UKCA October 2025**
 - **Scaled trials and commercial development 2026**



**THANK
YOU**

enTrust microgrid

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