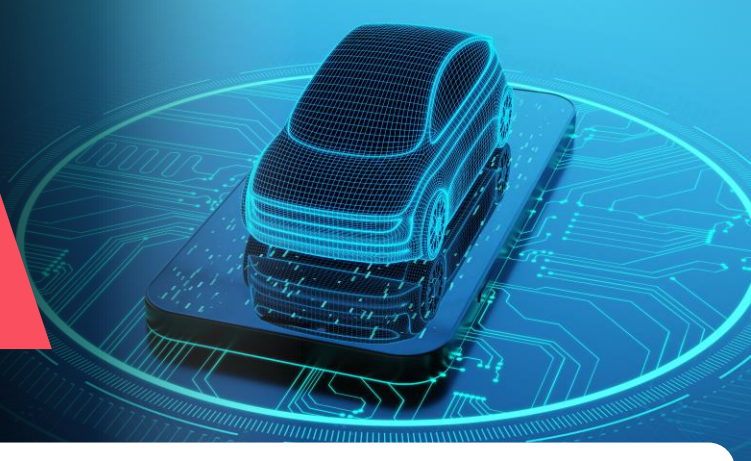
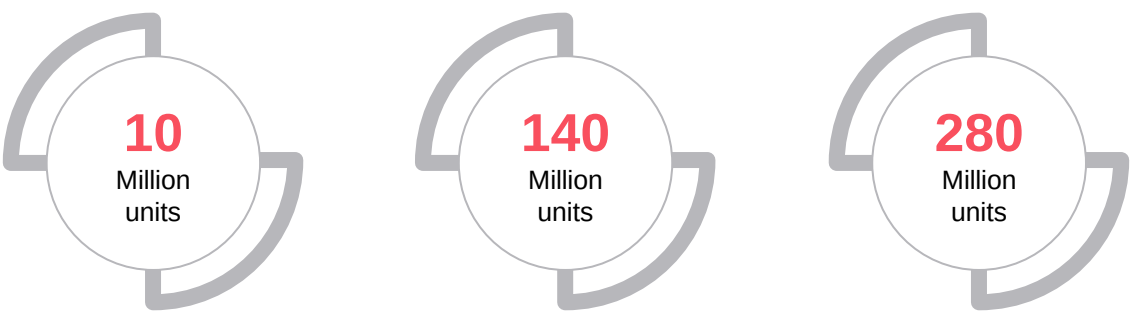
FutureBridge

Energizing the Future: Insights into Smart EV Charging



Smart electric vehicle (EV) charging is a transformative approach that optimizes the charging process for electric vehicles by leveraging technology and data. This is achieved by facilitating real-time data communication between the electric vehicle, the charger, the charging operator, and the utility company.

The Growing EV Adoption Trend



The surge in EV adoption is fueled by government policies, soaring fuel costs, and a growing environmental consciousness.

Understanding Smart Charging

Smart Charging is the method of managing the charging of an electric vehicle to optimize the use of the electricity grid.

It involves the use of communication technologies to collect data on the charging needs of EVs and the availability of electricity in the grid. This data is then used to control the charging process in such a way that it minimizes the impact on the grid.

Concepts of Smart Charging

FORMS OF SMART CHARGING

Grid-connected charging

- This involves using a smart charger that is connected to the grid

On-board charging

- This involves using the EV's onboard charger to communicate with the charging station

THREE MAIN CONCEPTS

V2G (Vehicle-to-Grid)

This involves using EVs as a source of backup power for the grid

Load Shifting

This involves shifting the charging of EVs to times when the grid is less stressed, such as during the day when solar energy is abundant

Time-of-use (TOU) charging

This involves charging EVs at times when electricity is cheaper, such as off-peak hours

Benefits of Smart Charging

EVs can provide several services to the power system, including:

GRID SERVICES

Peak Shaving
Smart EV charging during quieter hours to lighten the grid's load

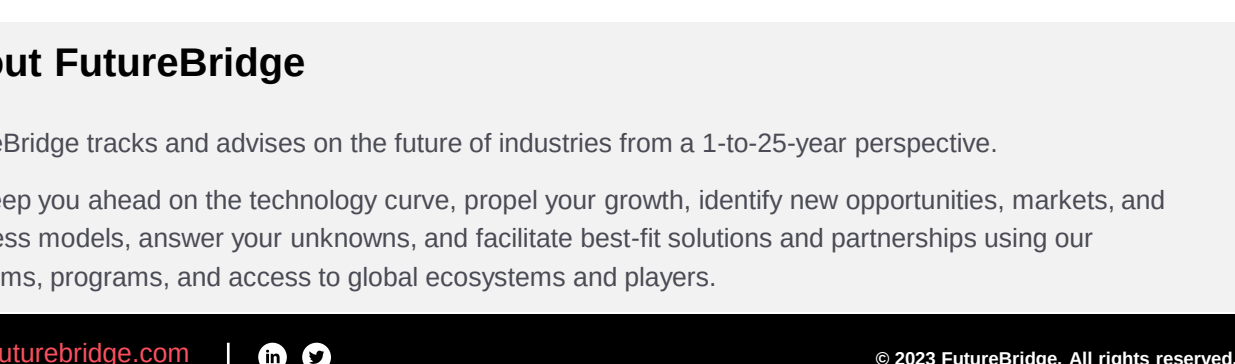
Load Balancing
Strategically shifting the charging of EVs to times when the grid is less stressed

Frequency Regulation
Harnessing EVs to stabilize grid frequency through precise battery charging or discharging

Backup Power
Tapping into EVs for reliable backup power during outages

Grid Flexibility

Smart charging as an enabler for EVs to provide flexibility to the grid



Source: IRENA

Ongoing Smart Charging Projects

California Vehicle-to-Grid (V2G) Pilot Program

Start: 2018

Players: PG&E, BMW, and the California Energy Commission

Goals: To test the use of V2G technology to provide backup power during outages and to explore the potential benefits of V2G for the grid

Smart Charging Demonstration Project in UK

Start: 2019

Players: National Grid, Nissan, and Innovate UK

Goals: To test the use of smart charging to reduce peak demand on the grid and to explore the potential benefits of smart charging for consumers and businesses

Smart Charging for EVs Project in Australia

Start: 2020

Players: ARENA, the Australian Energy Market Operator (AEMO), and the University of Melbourne

Goals: To test the use of smart charging to improve the efficiency of the electricity grid and to explore the potential benefits of smart charging for consumers and businesses

Future Trends

- With 100% adoption, smart charging will reduce peak grid load by 7%, revolutionizing sustainable transportation and energy efficiency. This marks a significant leap towards a greener future.
- With an expanding EV presence, smart charging will play a pivotal role in efficiently managing charging load and maximizing grid utilization.
- Smart charging has the potential to provide several other benefits, such as reducing peak demand, improving grid flexibility, and providing backup power during outages.

About FutureBridge

FutureBridge tracks and advises on the future of industries from a 1-to-25-year perspective.

We keep you ahead on the technology curve, propel your growth, identify new opportunities, markets, and business models, answer your unknowns, and facilitate best-fit solutions and partnerships using our platforms, programs, and access to global ecosystems and players.