

# TECH SCAN

## EV CHARGING STATIONS



An electric vehicle (EV) charging station is a technology connecting EVs to electricity sources for recharging. Serving electric cars, neighbourhood EVs, and plug-in hybrids, these stations vary in features. While some provide more fundamental features, others have more advanced features like smart metering, cellular connectivity, and network integration.

The arena of EV charging station patents is constantly evolving, marked by continuous innovation and new breakthroughs. Companies engaged in EV technology, energy, and infrastructure consistently file patents as a strategic move to safeguard their inventions and maintain a competitive edge in the market.

This dynamic landscape reflects the industry's commitment to advancing charging technologies, enhancing user experiences, and addressing challenges associated with EV adoption. As a result, the patent landscape serves as a barometer for the rapid progress and fierce competition within the electric mobility sector. As public awareness of embracing more sustainable solutions emerges in the upcoming days, EV charging will evolve to be a necessity rather than a trendy technology advancement.



# TIMELINE



# PATENTABLE COMPONENTS

## Connectors and Cables

- Design of Connector
- Energy Efficiency
- Safety- Temperature Safety Monitoring

## Charging Control Systems

- Dynamic Charging Control
- Load Management and Balancing

## Grid Integration and Communication

- Grid Balancing Features
- Real-time Data Exchange
- Optimize Energy Usage
- Bi-directional Power Flow

## Smart Charging Technologies

- Remote Monitoring
- User Authentication
- Payment Processing
- Wireless Charging Technologies

## Physical Infrastructure

- Shelter Designs
- Placement Strategies
- User Interface Designs

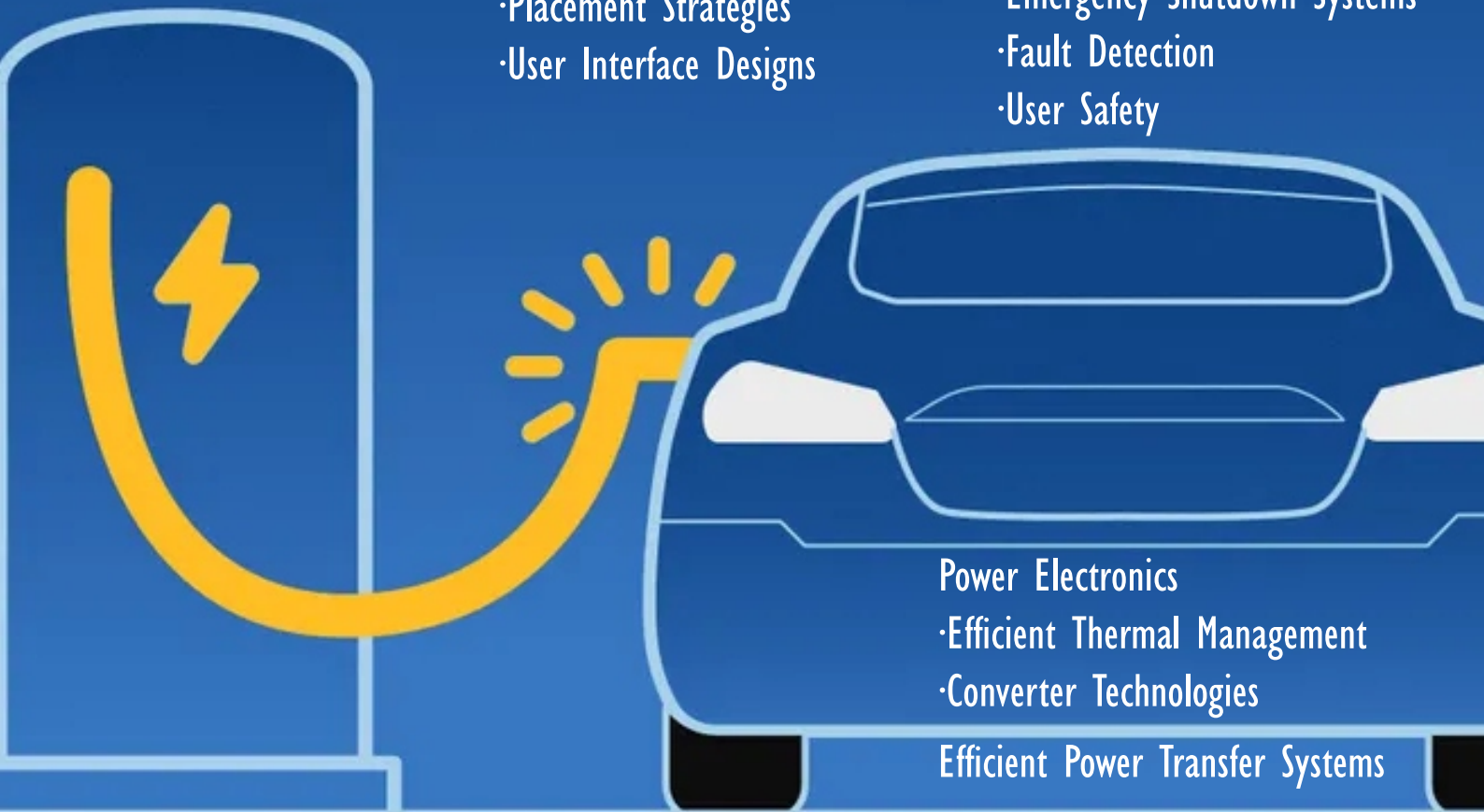
## Safety Features

- Emergency Shutdown Systems
- Fault Detection
- User Safety

## Power Electronics

- Efficient Thermal Management
- Converter Technologies

## Efficient Power Transfer Systems





# PATENT STATISTICS

2020  5138


2019  4493

2021  6033


2022  5103


2023  2625+

## TOP APPLICANTS

 209  
Honda Motor

 254  
Ford Global Technologies


 176  
Byd

 187  
LG Energy Solution

 917  
State Grid Corporation of China

 449  
Hyundai Motor

 452  
Kia Motors

 276  
Toyota Motor

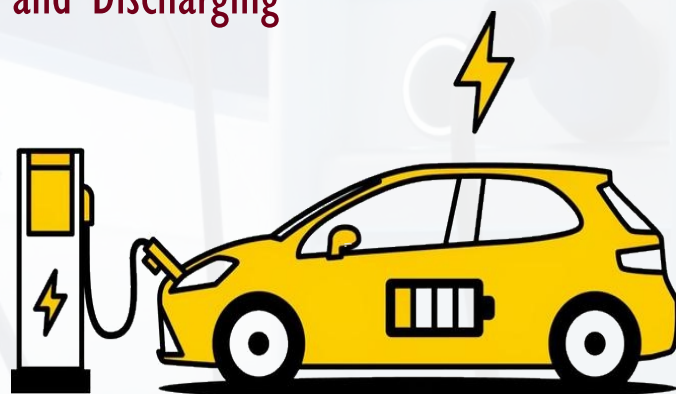
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# NOTABLE INNOVATIONS

Patent Application	Priority Date	Title	Assignee
WO2023199317	Apr 10, 2023	Electric Vehicle Supply Equipment with Maximum Cyber Safety	MaxEVS Ltd.
CN115640962	Oct 11, 2022	Site Selection Method and System for Electric Vehicle Charging Stations in Community and Storage Medium	State Grid Corporation of China State Grid Tianjin Electric Power Co
US 2023/0349705 A1	May 2, 2022	EV Charging Station Optimization	Ford Global Technologies Llc.
JP 2023116168 A	Feb 9, 2022	Vehicle, Vehicle Control Device, and Charging System	Toyota Motor Corp
WO2023039272	Sep 13, 2021	Mobile EV Charging Station	The Shyft Group Inc.
CN 113733963 A	Aug 31, 2021	Photovoltaic Storage and Charging Integrated Station Day-ahead Scheduling Method, System and Device and Storage Medium	State Grid Beijing Electric Power Co State Grid Corp China
CN 112721706 A	Dec 8, 2020	Capacity Optimization Method Considering Elasticity for Energy Storage System of Electric Vehicle Charging Station	State Grid Corp China Univ Xi An Jiaotong
CN116325652	Sep 28, 2020	Device and Method for Mutual Authentication of Electric Vehicle Charging	Hyundai Motor Company Kia Motors Corp. Myongji University Industry and Academia Cooperation Foundation
KR 20220008238 A	Jul 13, 2020	Method Of Changing Target Power Transfer Level and Power Transfer Apparatus for Implementing the Same	Hyundai Motor Co Ltd Kia Corp
US 2021/0086651 A1	Aug 13, 2019	Systems And Methods for Electric Vehicle (EV) Charging Station Management	Honda Motor Co. Ltd.
Wo2020231911	May 13, 2019	Charging Station with Articulating Panels	Volta Charging Llc

# WHITESPACE

- Pre-booking Apps
- Customized Interface
- Hydrogen and Natural Gases for Electricity Generation.
- Economically Available Superfast Charging
- Solar-powered Wireless Charging
- Wind Turbine Charging Station
- Integrating Renewable Energy Sources in Charging Stations
- High- capacity Charging Infrastructure
- SHAP-based Machine Learning Method
- EV Charging Timeslot Reallocation
- Customizing EV Charging Station Services for Users with Disabilities by Implementing Sensors for Attendant Guidance
- Blockchain Technology as a Reward System
- Blockchain System for Managing Charging and Discharging
- EV Cloud-Based Charge Estimation
- IOT Based Smart EV Charging
- Propane-fuelled Mobile Charging Stations
- Green EV Charging Points
- Cost Effective EV Charging.
- V2G Fast Charging
- Cyber Security



## PATENT LANDSCAPE

CN  
17309

KR  
2906

US  
2065

DE  
1441

JP  
1132

IN  
814

EP  
313

TW  
201

GB  
182

WO  
366

Database: Questel Orbit

If you would like to learn more about any of these areas or have specific questions, we're here to provide further information and insights. Our team is dedicated to driving progress and staying at the forefront of EV Charging Stations.

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