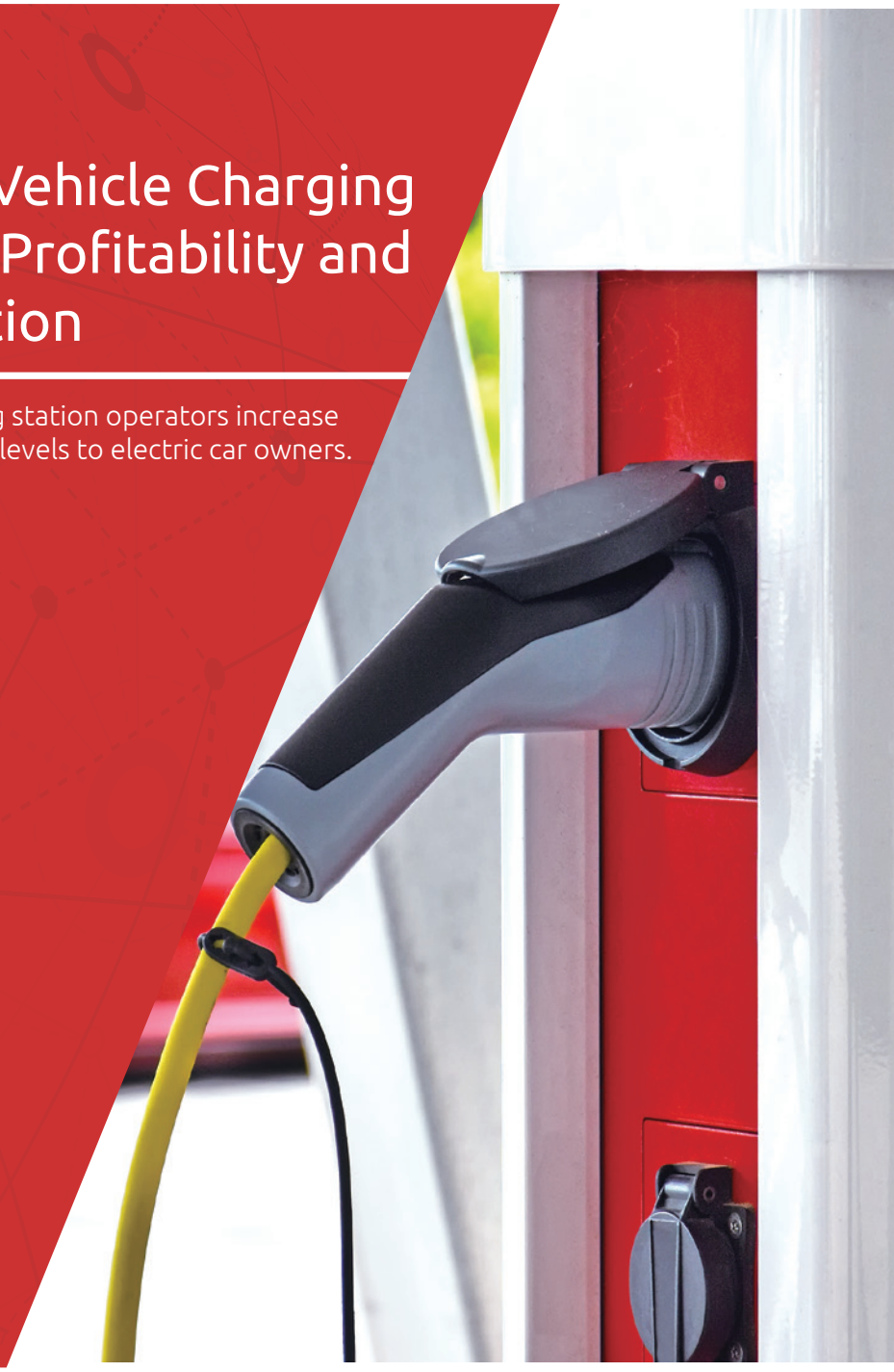
ADLINK
Leading EDGE COMPUTING

Application Story

IoT-Based Electric Vehicle Charging Solution Increases Profitability and Customer Satisfaction

ADLINK MXE-210 Series helps charging station operators increase profitability and deliver higher service levels to electric car owners.



www.adlinktech.com

2019

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Situation

Electric car demand is accelerating, as sales are expected to grow from more than 2 million in 2018 to 56 million by 2040, capturing 57 percent share of the entire car market.[1] But before this forecast becomes reality, many more battery chargers must be deployed. The International Energy Agency forecasts the number of publicly-accessible (slow and fast) chargers will grow from 3.5 million in 2020 to 22.1 million in 2030, a greater than six times increase (as shown in Figure 1).[2]

To help meet this electric vehicle (EV) charger demand, systems integrators and solution providers must deliver solutions for a wide range of charging venues and station operators. Electric car owners may choose to charge their cars at home or at public areas and commercial locations, like apartment complexes, workplaces, shopping malls, and libraries. The operators of these stations may be individuals, energy apartment complex owners, energy service providers, commercial businesses, etc.

Business Challenges

Many charging stations are 'unconnected' and require energy usage information to be collected manually, which greatly hinders an operator's ability to control station operation in real time. This is because these charging stations are unable to send critical information over the Internet, like customer charging patterns, behaviors, and energy usage. With the right information in hand, charging station operators could be more profitable and offer higher levels of service to end customers. Here are just a few examples:

Set pricing based on key factors

Charging stations that can send comprehensive information to the cloud enable operators to set the price that drivers pay based on energy cost, duration, time of use, session length, driver group, etc.[3] Operators will also be able to better assess overall power usage and optimize contracted capacity, such as slowly charging vehicles to keep energy bills from ballooning too quickly. This is important because the cost of electricity could increase two to three times due to a premium assessed by the power company after a charging station reaches its contractual energy limit.

Enhance the customer experience

Customers will greatly appreciate the convenience of getting charging station information on a mobile app, like vehicle changing status (e.g., 50% charged) or charging station availability.

Optimize charging strategies

Operators may want the flexibility to adjust the operation of stations based on a number of factors, like how many charging posts are occupied or time-of-day energy rates. For example, stations could charge vehicles faster (i.e., send more current) if a station is not fully occupied or give apartment complex residents the flexibility to schedule their vehicle charging in order to take advantage of lower off-peak energy rates.

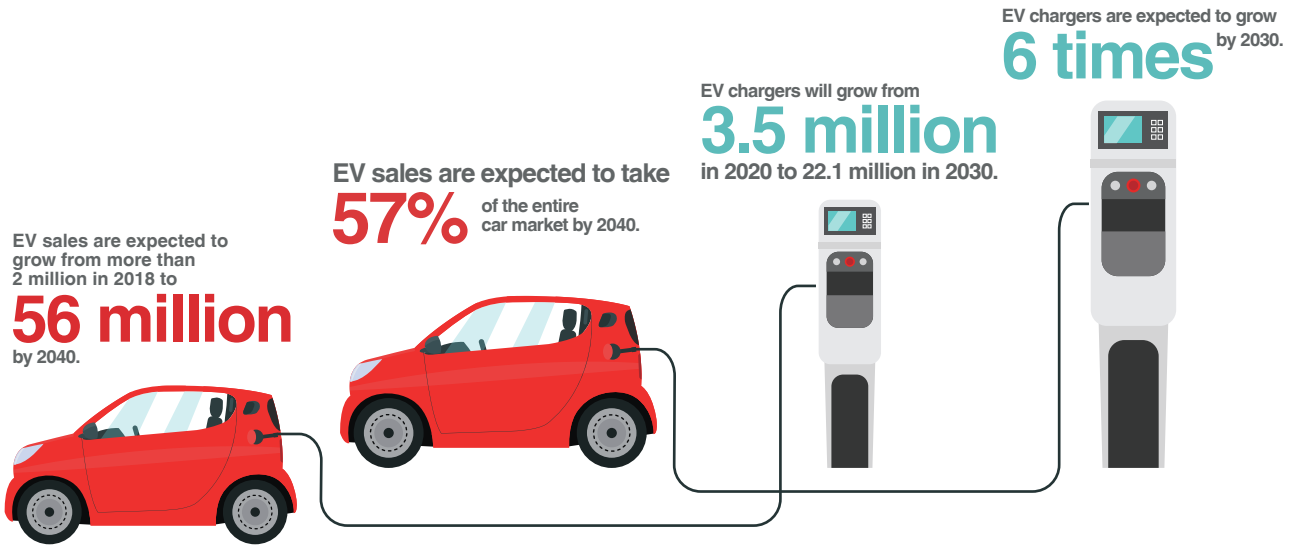


Figure 1. EV chargers are expected to grow 6 times by 2030.

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Solution

Systems integrators and solution providers can connect charging stations to the cloud using the palm-size ADLINK MXE-210 Series gateway and controller that connects the charging post meter to the Internet. It is an easy-to-use, off-the-shelf gateway with a 10-year lifecycle.

This Internet of Things (IoT) gateway gives station operators real-time access to charging information and allows cloud-based applications to intelligently control the stations. The gateway, coupled with cloud-based applications, helps regulate charging current, change the charging priority of vehicles, monitor energy usage to avoid premium energy rates, and much more, as shown in Figure 2. The gateway can also integrate cameras to capture proof of charging in case there is a billing dispute between station operators and car owners.

Designed for environmentally-harsh IoT applications, the ADLINK MXE-210 is industrial-grade, EMC-certified, and fully operational in a -40°C to 85°C temperature range. The gateway has been tested under stringent, electrical fast transients (EFT) and surge conditions per EN-61000-6-4/-2 standards. The MXE-210 Series ensures reliable operation in outdoor or semi-outdoor environments, even with voltage fluctuations on power supply lines caused by thunder strikes and charging multiple EVs at the same time.

The MXE-210 Series provides high expansion capability, multiple wireless connectivity, and comprehensive security. Hardware and software integrity are assured with TPM 2.0, Intel® Boot Guard, and Unified Extensible Firmware Interface (UEFI) Secure Boot.

Success Story

The MXE-210 Series has been selected by a renowned charging station solution provider to connect their charging stations to the cloud for a tier one electric vehicle manufacturer. The ADLINK gateway allows the solution provider to provide exceptional connectivity, compactness, reliability, and other capabilities that benefits stakeholders, including station operators and car owners.

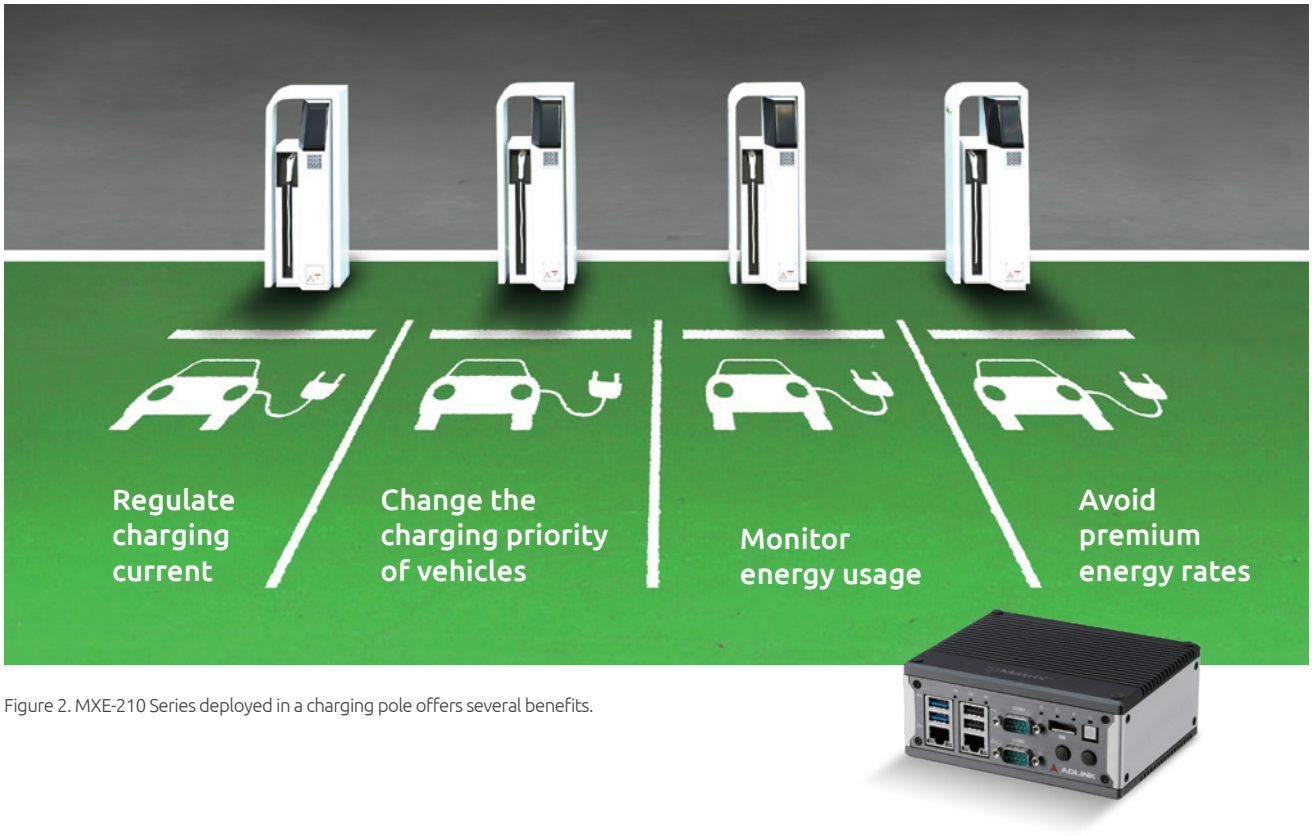


Figure 2. MXE-210 Series deployed in a charging pole offers several benefits.

1. Bloomberg New Energy Finance, "Electric Vehicle Outlook 2019," https://about.bnef.com/electric-vehicle-outlook/#toc-download.
2. International Energy Agency, "Global EV Outlook 2018," https://www.iea.org/gevo2018.
3. "ChargePoint Cloud Plans Power Up Your Charging Stations," https://www.chargepoint.com/products/plans/?desktop=true.

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