

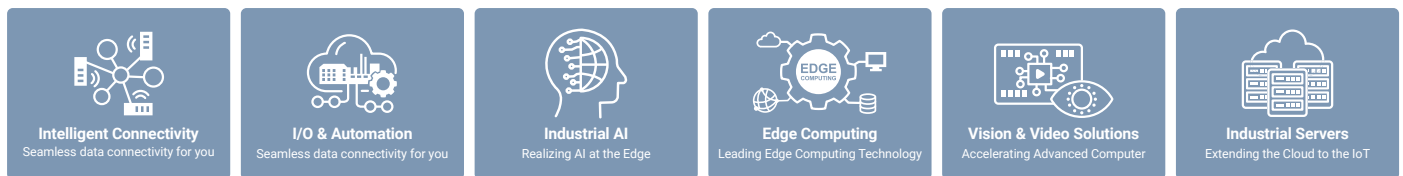
Digital Transformation for a Sustainable Future

The Industrial Internet of Things (IIoT) is revolutionizing numerous global sectors. For the energy sector in particular, there is massive potential for industry improvements and sustainability through system digitalization. As IIoT technologies and digital transformation reshape operations, they also pave the way for more advanced green energy solutions. This game-changing shift not only empowers energy providers, system integrators and equipment manufacturers, but also benefits the public.

By fostering the creation of smart connected systems, we can boost operational effectiveness, optimize supply and demand management, streamline equipment maintenance, bolster public safety, improve asset management and open the door to a more sustainable future.

Exciting advancements in green energy are driven by innovative IoT technologies like edge computing, artificial intelligence, industrial automation, intelligent connectivity and data analytics. As the successful management and operation of these systems hinge on digitalization, it is essential to design tailored solutions for energy applications and unique operating environments.

Bringing Industrial IoT Solutions to You



Renewable Energy



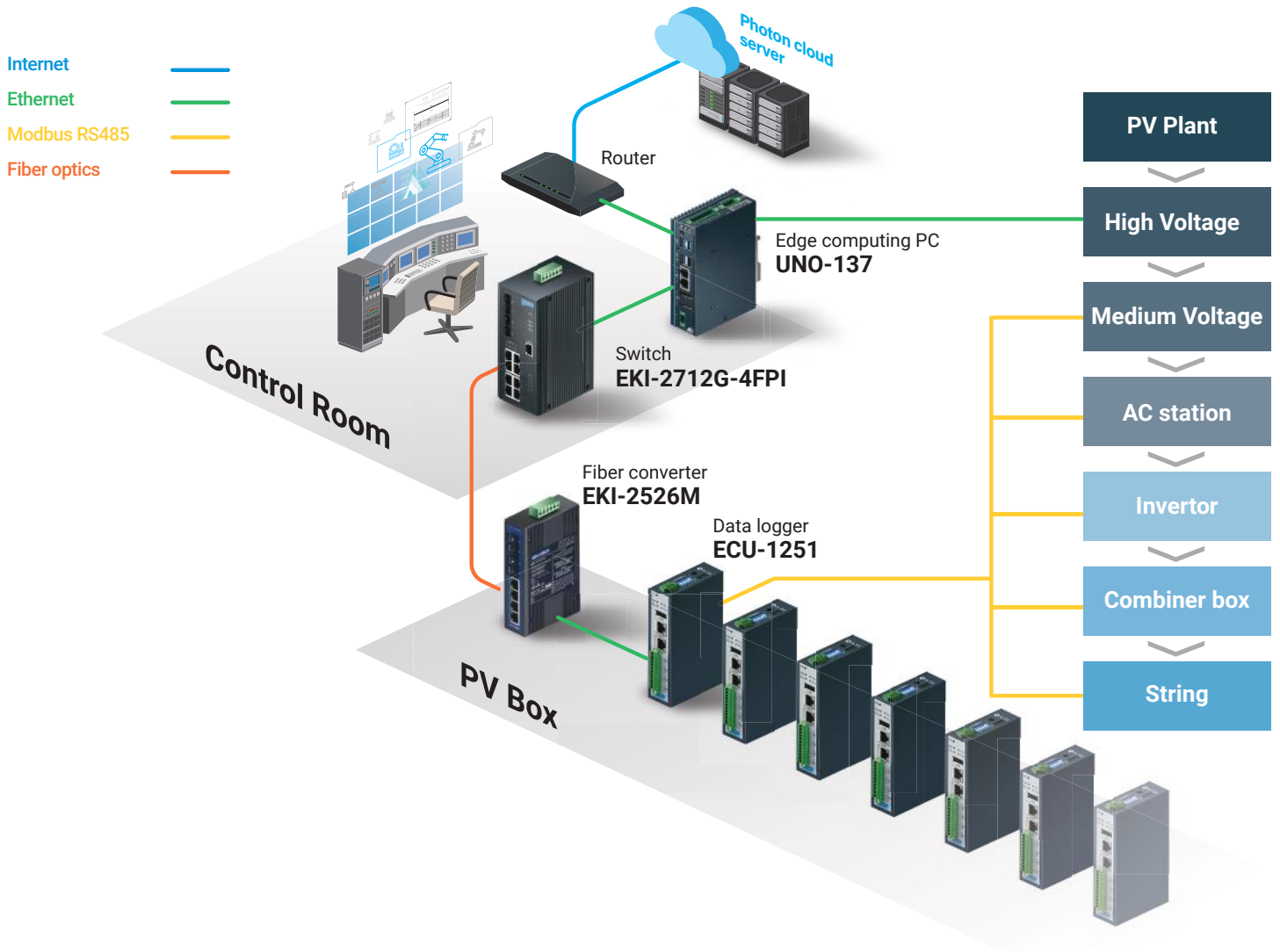
Renewable energy refers to power generated from naturally replenishing sources, such as solar, wind, geothermal and hydro energy. As demand grows, managing renewable energy grids presents significant challenges. System digitalization is essential for efficient energy integration, real-time monitoring, operations management and sustainability. Scaling up renewable energy generation requires new technologies to address challenges in current IT/OT systems, differing geographic locations, load balancing for supply and demand, grid stability and operational complexities.

The electric power sector accounted for about 59% of total U.S. renewable energy consumption in 2021, and about 20% of total U.S. electricity generation was from renewable energy sources.

Source: U.S. Energy Information Administration (<https://www.eia.gov/energyexplained/renewable-sources/>)

How Advantech can help

- Predictive analytics solutions for actionable business intelligence
- Cloud computing with wide connectivity and data exchanges
- Modular architecture to support varying business models
- Intelligent solutions to gather operational and equipment data



Energy Storage Systems (ESS)



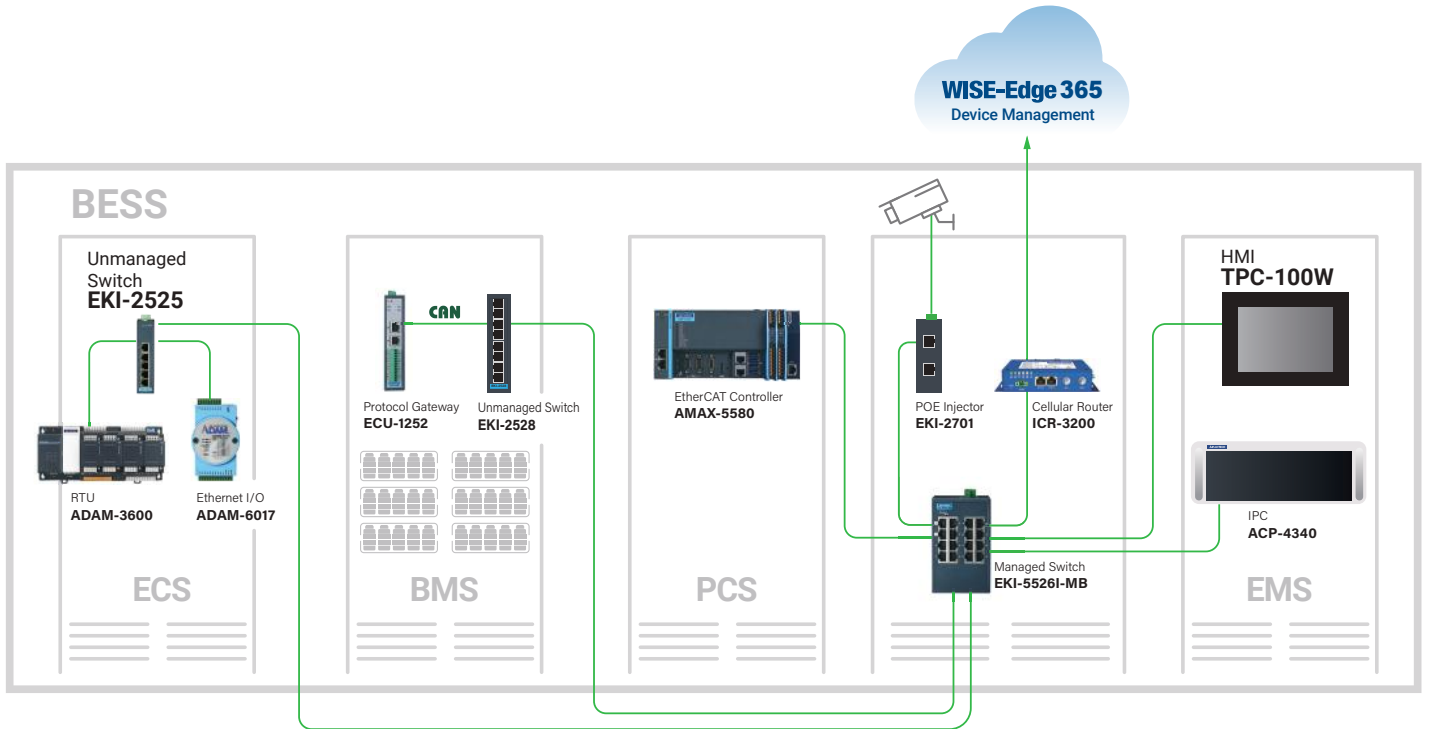
Energy storage plays a crucial role in generating, transmitting, distributing and consuming power. As renewable energy expands and de-carbonization becomes vital, maintaining reliable power delivery is a growing challenge. Modern energy storage systems employ diverse technologies for managing power supply and demand, resulting in a resilient, flexible and sustainable energy infrastructure for utilities and consumers.

Large-scale battery storage capacity will grow from 1 GW in 2019 to 80 GW in 2030, according to the average forecast
Source: American Clean Power (<https://cleanpower.org/facts/clean-energy-storage/>)

How Advantech can help

- Comprehensive product portfolio for ESS builders and systems integrators
- Data acquisition and edge computing solutions
- Industrial communication, automation and control solutions
- IoT technologies to balance and optimize demand and supply

Energy Storage Systems Application Diagram



Electric Vehicle Charging Infrastructure



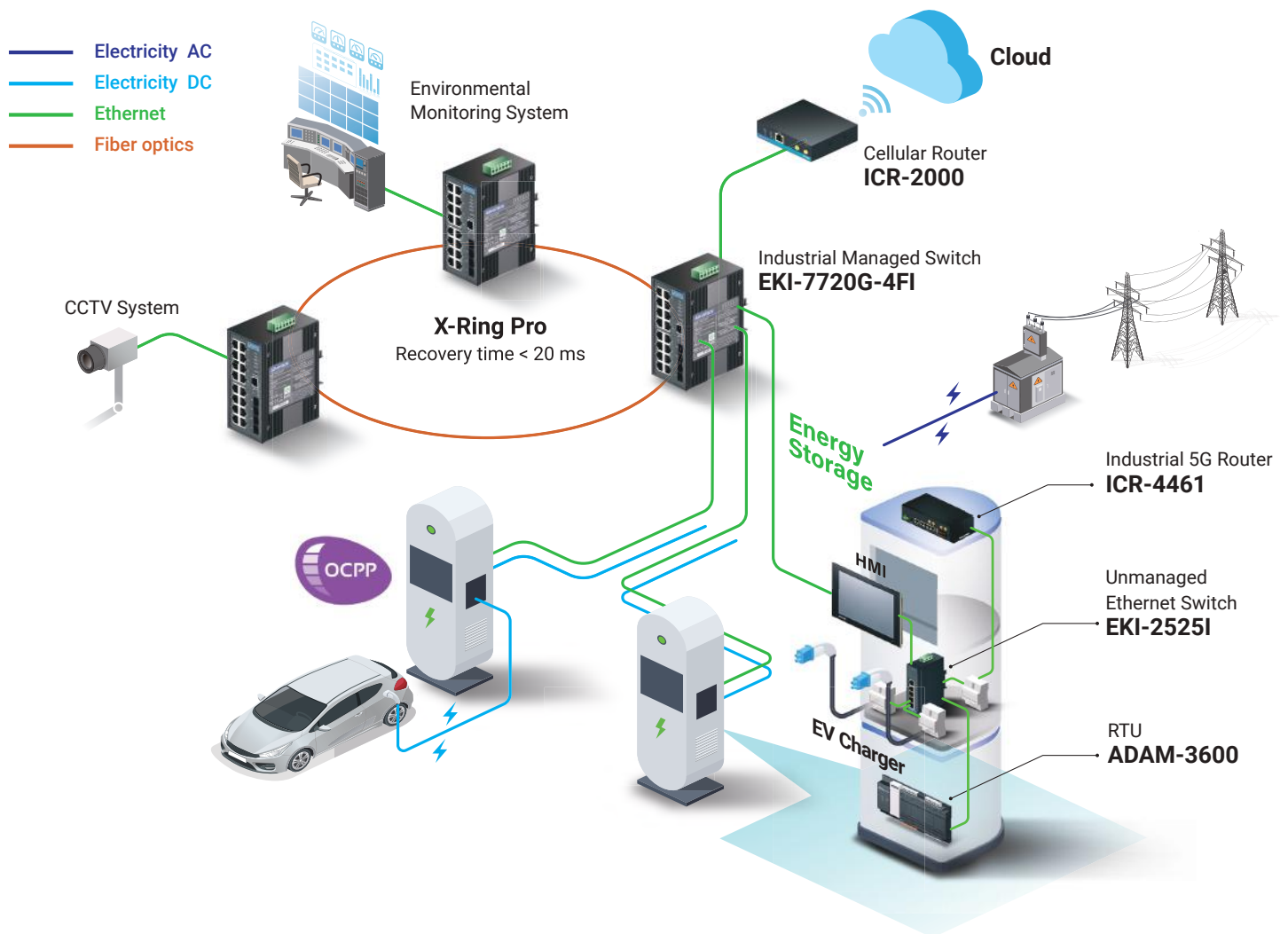
Demand for electric vehicles (EVs) is growing due to government incentives, environmental requirements and sustainability, leading many enterprises to invest in EV charging solutions. As public support and consumer interest in electrification rises, there are also challenges to address. The U.S. must ensure EV infrastructure is in place in terms of both physical space and adequate power supply. It is important to consider power supply for increasing EV consumption, which may lead to unbalanced energy distribution and/or grid instability.

IEA estimates that by 2030, there will be 22 million global electric vehicle sales—2.3 million of those purchases in the U.S. alone.
 Source: IEA (2022), Global EV Outlook 2022, IEA, Paris <https://www.iea.org/reports/global-ev-outlook-2022>

How Advantech can help

- Network reliability for charging point service quality
- HMI and display solutions for charging cabinets
- Industrial communication and edge compute systems
- Charging point data collection and transmission
- Embedded single-board computers

EV Charging Station Application Diagram



Advantech Green Energy Product Highlights



Communication Gateways

- ECU-1251 IEC 61850-3 Edge Communication Gateway
- ECU-1252 TI Cortex A9 Industrial Communication Gateway
- ECU-150 NXP i.MX8M Quad Core Cortex A53, High-Performance Protocol Gateway



Industrial Communication

- EKI-25258I Unmanaged Industrial Ethernet Switch
- EKI-5528I-MB 8FE Managed Ethernet Switch support Modbus/TCP
- EKI-7428G-4XP 24GE+4 10G SFP L2 Managed PoE Switch



Single-Board Computer

- MIO-5375 11th Gen. Intel® Core U-series i7/i5/i3/Celeron
- MIO-2363 Intel Atom x6000E Series



HMI & Industrial Thin Client

- TPC-1551T 15" Thin-Client Terminal with Intel® Atom™ Processor
- TPC-110W 10.1" ARM-Based Touch Panel PCs



Industrial PCs

- UNO-137 Edge Computing PC
- ACP-4340 4U Rackmount Chassis



Remote Terminal Units

- ADAM-3600 Intelligent Remote Terminal Unit



Entry-Level 4G Gateway

- ICR-2441 Entry-Level 4G Router



Cellular Routers & Gateways

- ICR-4461 Ultra-High-Speed 5G Router & Edge Computer

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