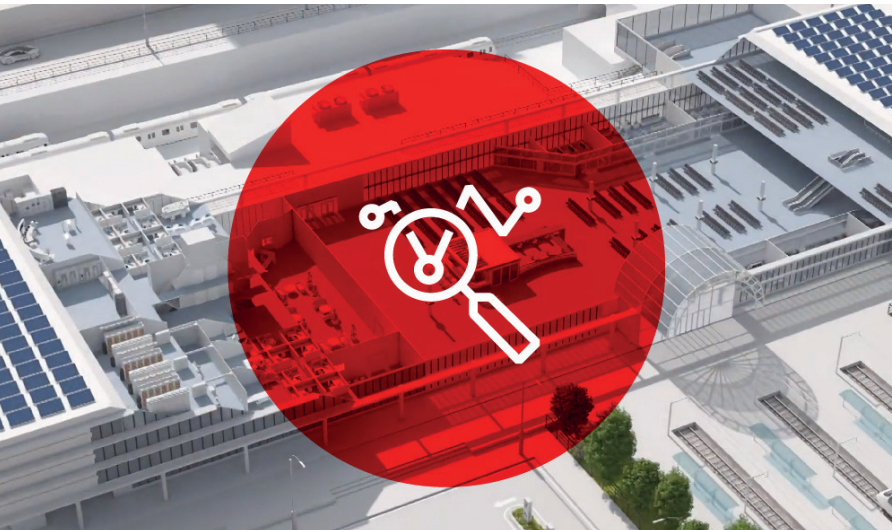


Intelligent Distribution For Passenger Stations

Rail Transportation & Infrastructures



With over 70 years' experience and global presence in more than 100 countries, ABB helps to keep the world moving with new, innovative and sustainable solutions targeted on creating a low-carbon rail industry able to operate with maximum efficiency, reliability and safety.

What is intelligent distribution?

Intelligent distribution means leveraging on new digital technologies to transform traditional electrical installations into smart connected architecture for 24/7 comprehensive monitoring, insights and analysis. The aim is to improve energy consumption and asset performance targeted on sustainability, energy efficiency, cost savings and continuous operation.

Why you need intelligent distribution

Reliability is a major concern in the rail industry. Last year, reliability issues increased by 64% causing delays amounting to 8612 hours in the UK alone. And as the demand is growing for rail as a sustainable form of transportation, ABB intelligent distribution applications offer solutions able to ensure safe, smooth rail operation, maximize energy efficiency, reduce carbon footprint, minimize running costs and downtime while ensuring 24/7 continuous service.

Main benefits

Energy Efficiency



Maximizes energy efficiency up to 30%, reduces carbon footprint and complies with LEED & ISO 50001 certification requirements.

Multi-site Analysis



Monitors and analyzes multiple passenger stations simultaneously with insights to benchmark station performance and take action to improve critical rail facilities.

Reliability



Maximizes reliability and avoids downtime thanks to 24/7 real time monitoring, smart analytics, predictive maintenance and instantaneous alerts.

Flexibility



Modular, scalable solutions that can be applied to both greenfield and brownfield installations.

Integrable



Ready for complex integration, also when several systems are involved; BMS, SCADA or facility management with 3rd party integration.

Key Facts



Globally speaking, transportation is responsible for 24% of direct CO2 emissions from fuel combustion.⁽¹⁾



Passenger rail activity is forecast to increase to 15 trillion passenger-kilometers in 2050.⁽²⁾ EU : Around 1.6 billion tons of goods and 7.1 billion passengers use rail transport every year.⁽³⁾

The global rail transport market is expected to grow to \$676.26 billion in 2026 at a compound annual growth rate (CAGR) of 7.4%.⁽⁴⁾



As more efforts are being made towards enhancing reliability, energy efficiency, safety and passenger experience, rail is being rediscovered as a sustainable and energy-efficient form of transport.



Reliability issues in the UK produced some 516,695 delay minutes⁽⁵⁾, equivalent to around 8,612 hours last year (2021). A 64% increase compared to the delay minutes of the previous year (2020).⁽⁶⁾ In another example, reliability issues produced around 5,600 train-delay hours in the USA, equivalent to roughly 700 eight-hour regional train trips.⁽⁷⁾

Backed by over 70 years' experience and global presence in more than 100 countries, ABB is a world-leading supplier of innovative technologies for rail transportation with a comprehensive range of solutions that meet the expectations of users and transport stakeholders for all key applications, including infrastructure, passenger stations, control and signalling units, tunnels and rolling stock. ABB helps to keep the world moving with new, sustainable approaches that enable customers to use energy effectively, the aim being to create a low-carbon transportation industry able to operate with maximum efficiency, reliability and safety.

Want to know more about our customer success stories?

ABB technology supports in monitoring the first ever metro system in Bangladesh, thereby helping to reduce CO2 emissions, power consumption and noise pollution thanks to high-accuracy statistical monitoring solutions and compliance with the industry metering and environmental standards. [ABBCaseStudies](#)

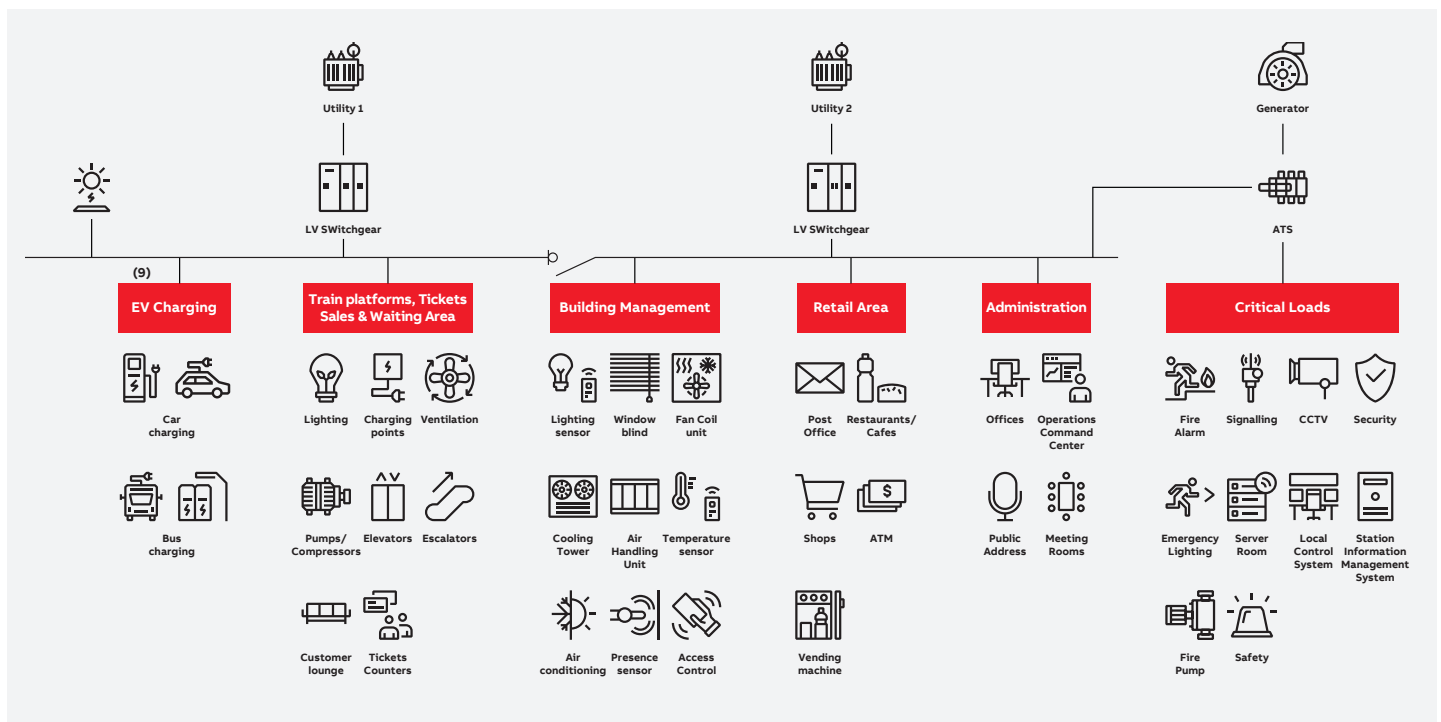
ABB supports the expansion of subway connections to Chongqing city, China, with power distribution and digital capabilities. This has created an accessible rail transit network that carries more than 3 million people each day. [ABBCaseStudies](#)

1. [Tracking Transport Report, IEA, 2020](#)
2. [Future of Rail Report, IEA, 2019](#)
3. [European Year of Rail and the importance of railways in Europe, CS Window, 2021](#)
4. [Rail Transport Global Market Report, GlobeNewswire, 2022](#)
5. [Delay Minutes By Operators, ORR, 2022](#)
6. [Passenger Rail Performance Report, ORR, 2022](#)
7. [Rail Report For America's Infrastructure, 2021](#)

Introduction

This application note focuses on ABB applications for passenger stations. The goal is to create user-friendly solutions that bring people and technology together. Because smart passengers deserve smart stations where journeys start in safe and pleasant conditions. We considered some key challenges for passenger stations, like reliability, energy efficiency, safety and security. The ABB intelligent distribution application provides a great measure of flexibility since it can be easily integrated with other BMS, SCADA or 3rd party systems via API⁽⁸⁾ and can be applied to both greenfield and brownfield installations.

- We split the passenger station systems into
- Train platforms and waiting areas for passengers.
 - Retail areas including restaurants, cafés, ATM and vending machines.
 - Small data centers, video surveillance, security, safety and other critical loads.
 - A building management system including lighting control, access control, HVAC and others.
 - Administration area.
 - Renewable energy sources such as photovoltaics.
 - Electric vehicle charging area for cars and buses.



The ABB intelligent distribution application for passenger stations is described in the following sections:

- [Main Distribution Boards \(Greenfield and brownfield\)](#)
- [Sub-distribution Boards \(Greenfield and brownfield\)](#)
- [Critical Loads](#)
- [EV Charging](#)
- [Emergency Lighting](#)
- [Fire Fighting Pumps](#)
- [Dewatering Pumps](#)



8. For more information about how to use our [APIs](#)
 9. For more information about ABB intelligent distribution applications for [PV](#)

Main distribution boards



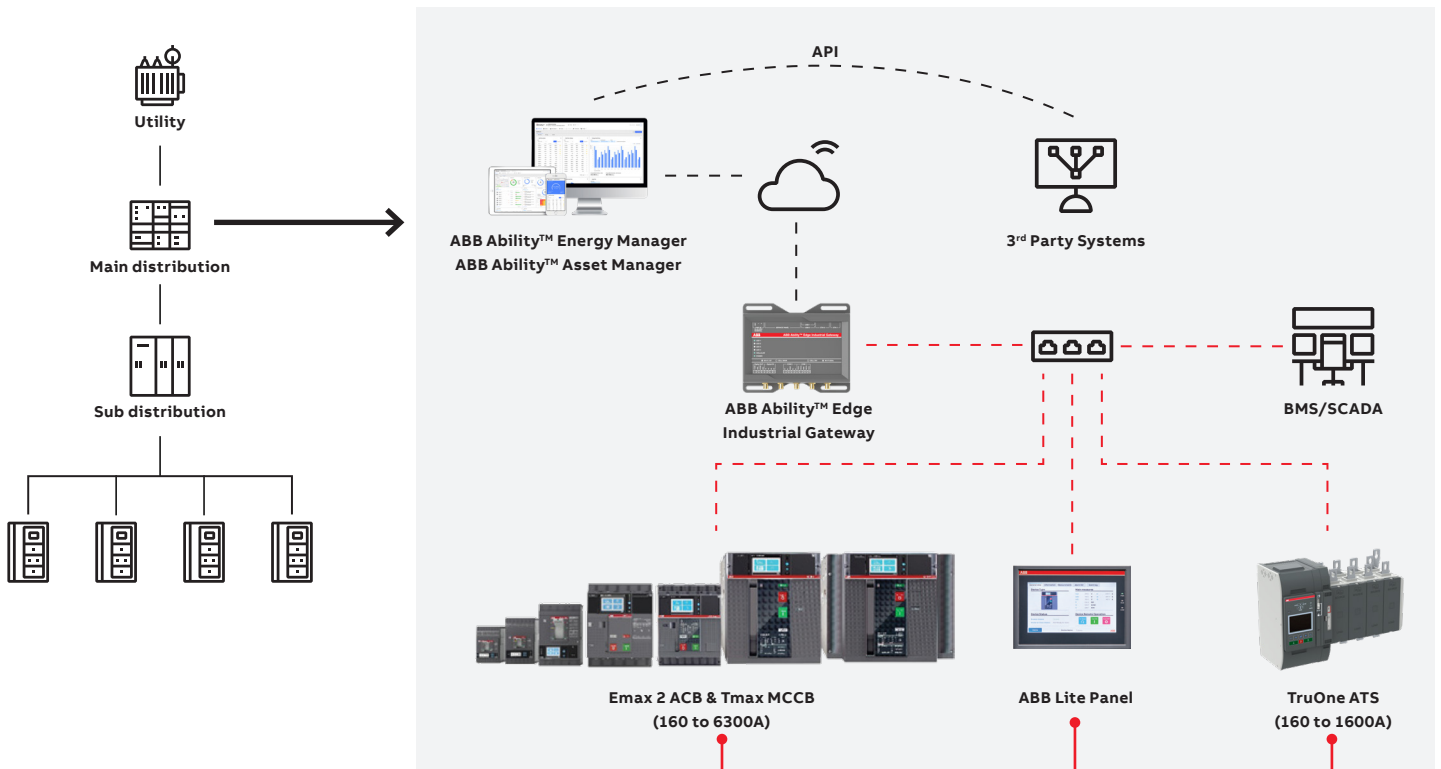
[Download the Application Note](#)

Click on the link or scan the QR Code to download the relative application note, which includes an architecture example and list of components (Bill of Material - BOM)

Main distribution boards are typically installed downstream of the main power source, either provided by the utility or an emergency generator. High performance is always guaranteed by 160 to 6300A air circuit breakers and molded case circuit breakers with 8 communication protocols to easily integrate with BMS or SCADA, in addition to the ABB Ability™ Energy Manager and ABB Ability™ Asset Manager cloud solution, which integrates energy and asset management in a single intuitive dashboard.

The solution features class 1 active energy measurement compliant with standard IEC61557-12.

As well as the innovative embedded ATS, ABB also offers TruOne, the first true all-in-one automatic transfer switch engineered to incorporate switch and controller in one seamless unit. Performance-tested beyond standard requirements, TruONE stands ready to ensure steady delivery of critical power at all times. Moreover, up to 28 electrical assets can be monitored and controlled by the ABB Lite Panel switchboard HMI, which can be directly connected to the on-premises communication network.



Unique user experience with 9 communication protocols supported:

- IEC 61850
- Modbus TCP/IP
- Modbus RTU
- Profibus-DP
- DeviceNet™
- Profinet
- EtherNet/IP™
- Hub
- Ekip Link

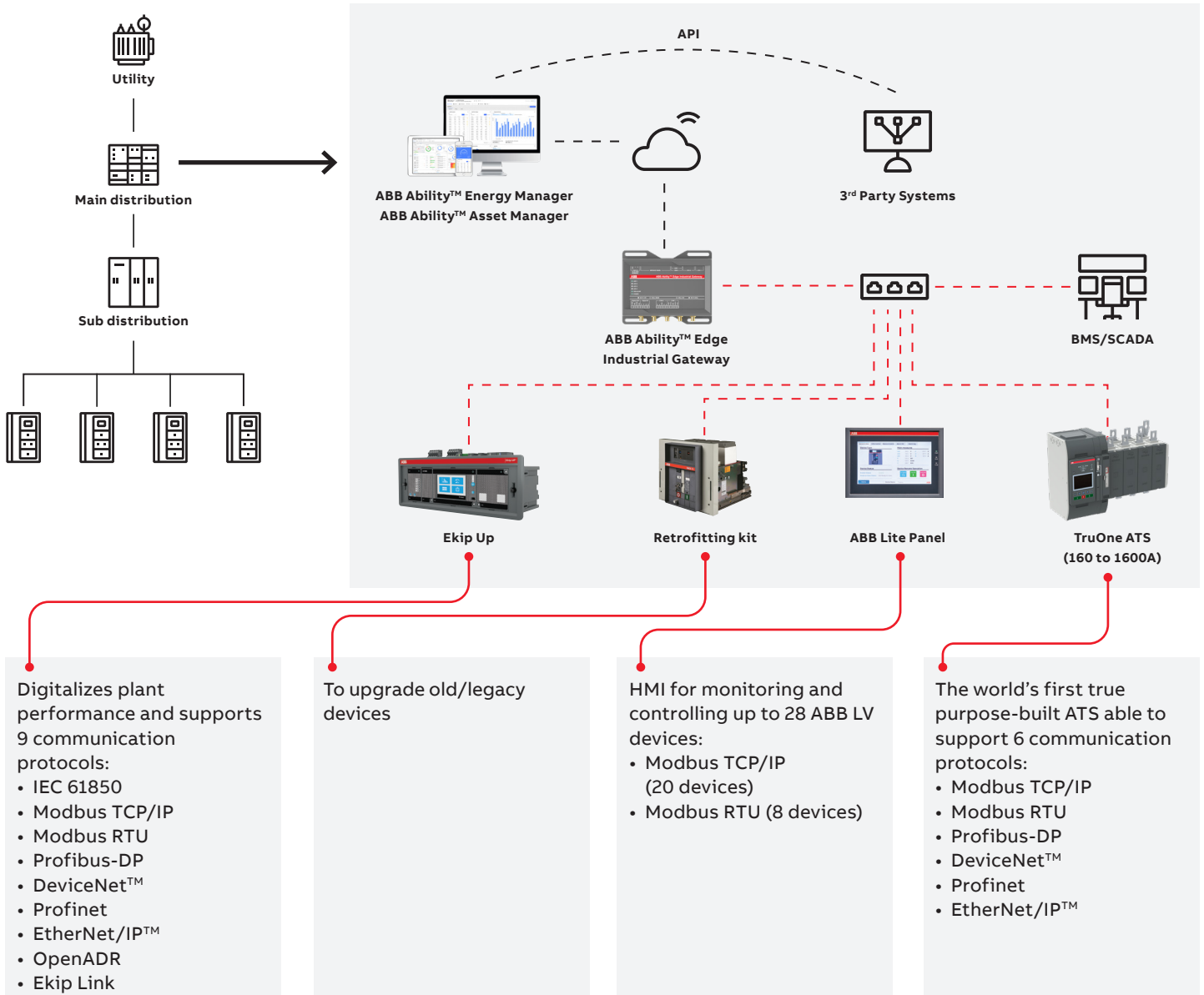
HMI for monitoring and controlling up to 28 ABB LV devices:

- Modbus TCP/IP (20 devices)
- Modbus RTU (8 devices)

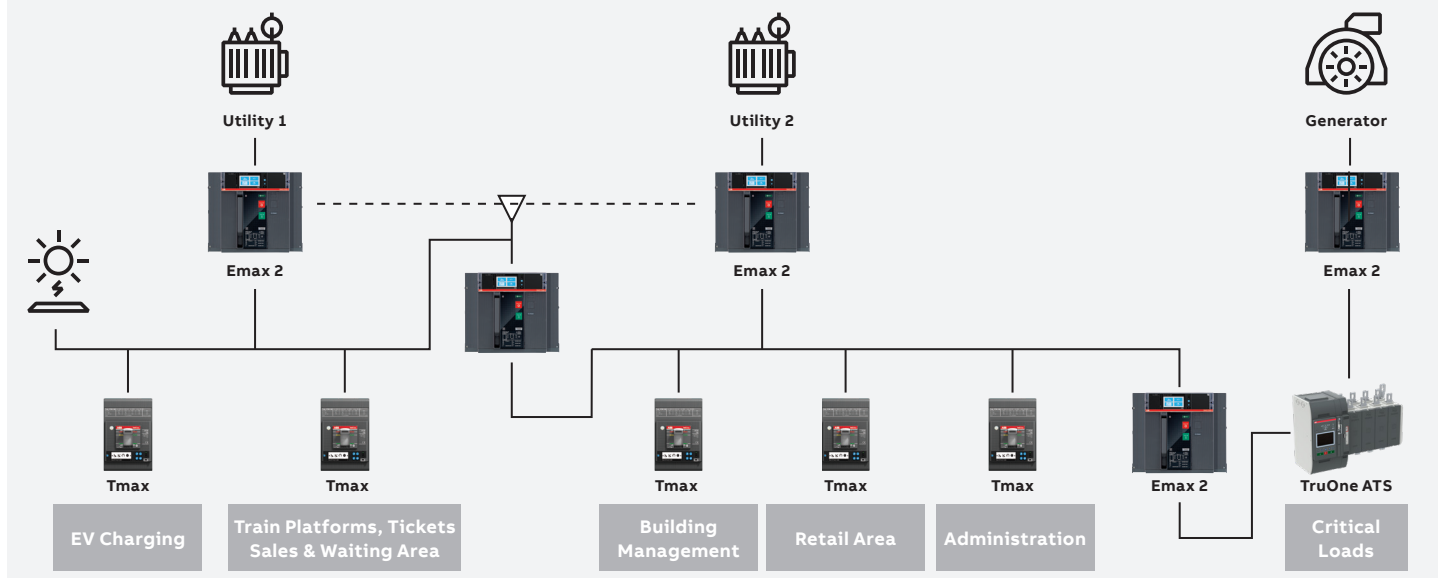
The world's first true purpose-built ATS able to support 6 communication protocols:

- Modbus TCP/IP
- Modbus RTU
- Profibus-DP
- DeviceNet™
- Profinet
- EtherNet/IP™

With minimal impact on current installation switchgear, ABB Ekip Up digital units for old/3rd party devices or retrofitting kits⁽¹⁰⁾ for legacy breakers are a cost effective, easy solution for upgrading your electrical system.



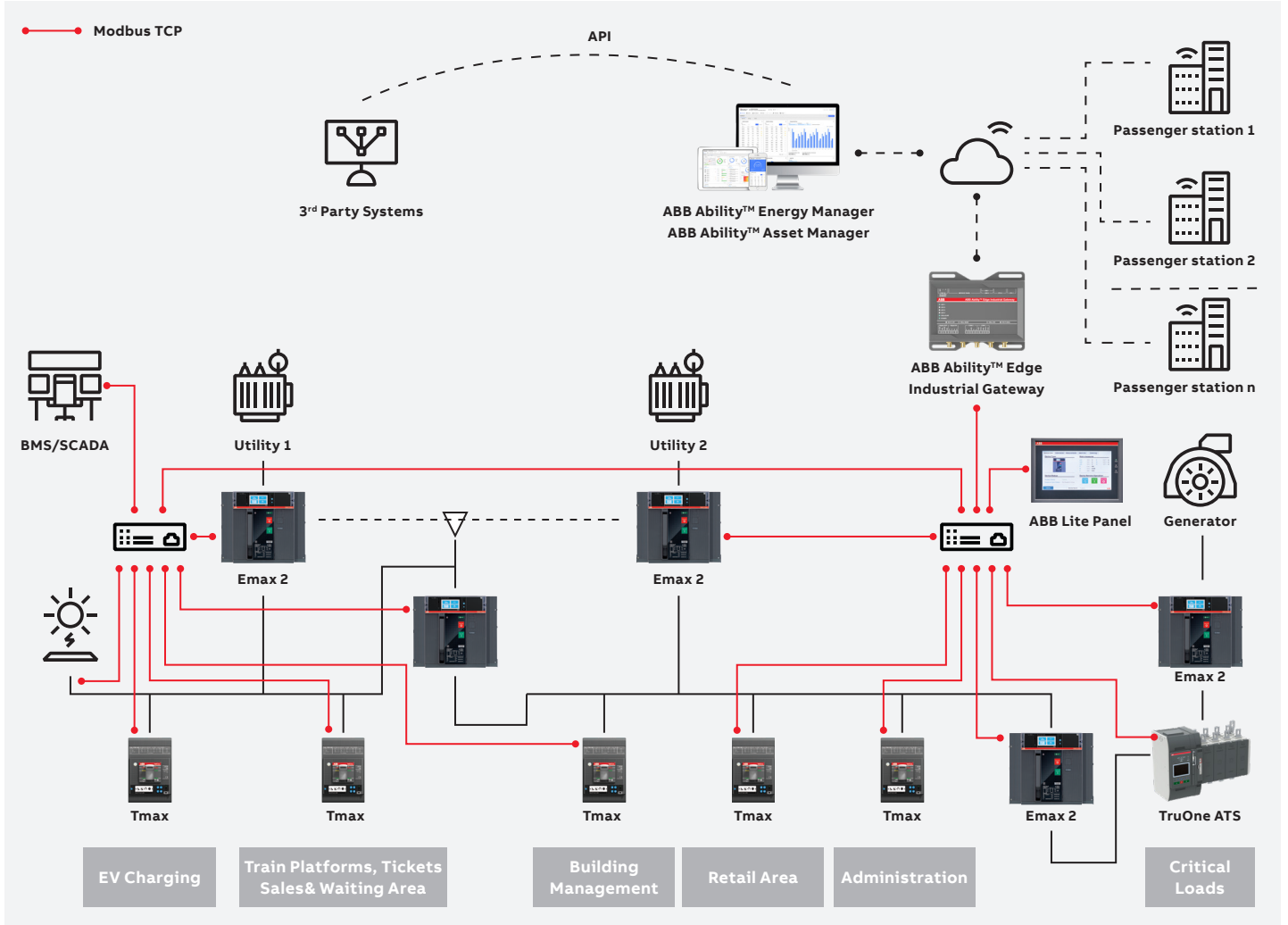
The single-line diagram, communication architecture and main components of a typical main distribution board are illustrated in the example below.



10. For more information about [ABB Extensions, Upgrades and Retrofits](#)

Thanks to their digital capabilities, ABB connected products can create smart architecture able to provide comprehensive monitoring solutions for single or multiple passenger stations, while ensuring continuous and reliable operation through ABB Ability™ Energy Manager & ABB Ability™ Asset Manager.

Solutions are available for monitoring the main incomings and outgoing while optimizing energy efficiency, cost savings, asset management and reducing carbon footprint thanks to smart analytics and predictive maintenance. All this plus higher flexibility and easy integration into BMS or SCADA systems, or even 3rd party systems via API.



Main Components



[Emax 2 Air Circuit Breaker](#)



[Tmax XT Molded Case Circuit Breaker](#)



[Ekip Up Digital Unit](#)



[TruOne ATS](#)



[ABB Lite Panel HMI](#)



[ABB Ability™ Edge Industrial Gateway](#)



[ABB Ability™ Energy Manager](#)



[ABB Ability™ Asset Manager](#)

Sub-distribution Boards



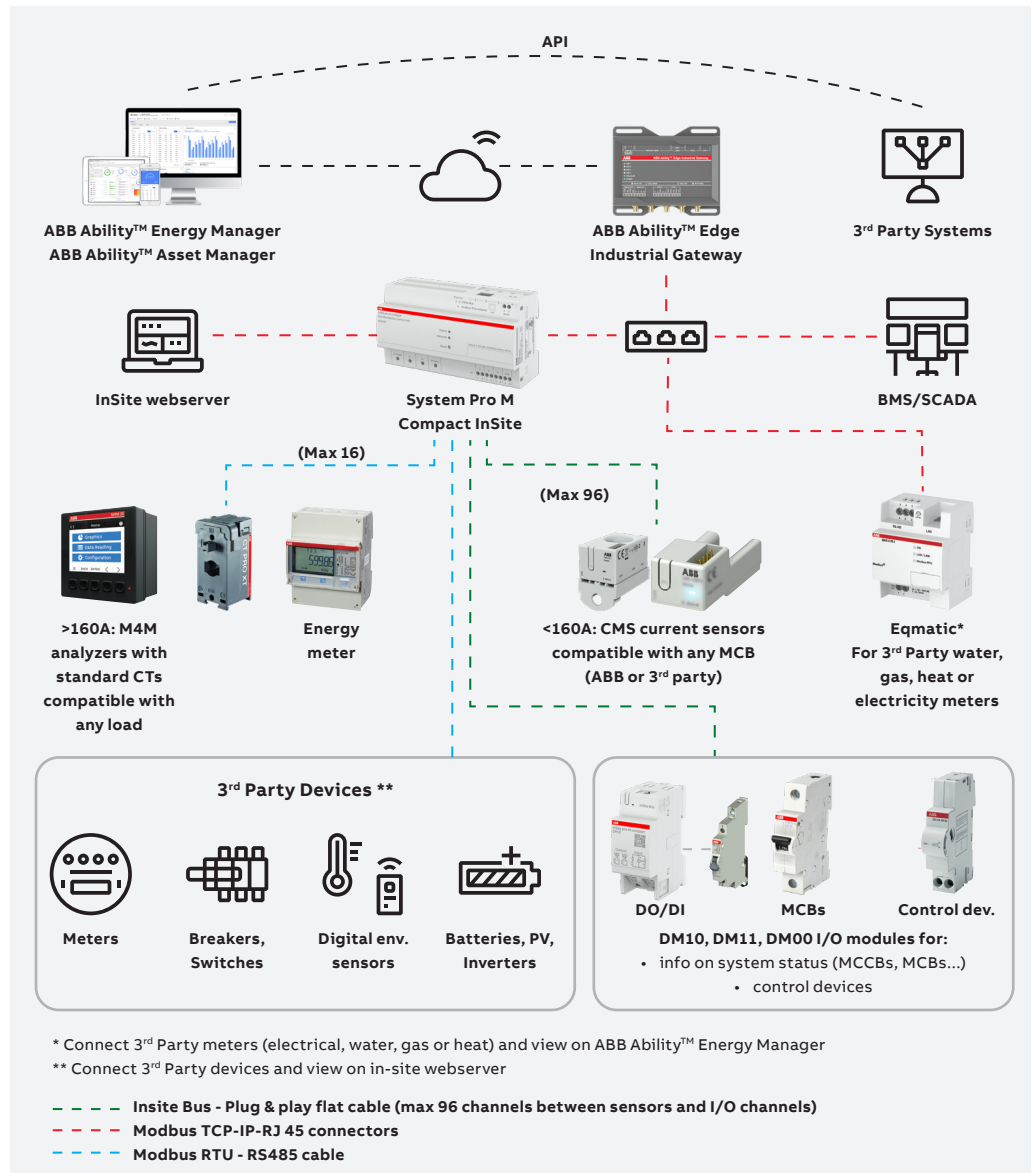
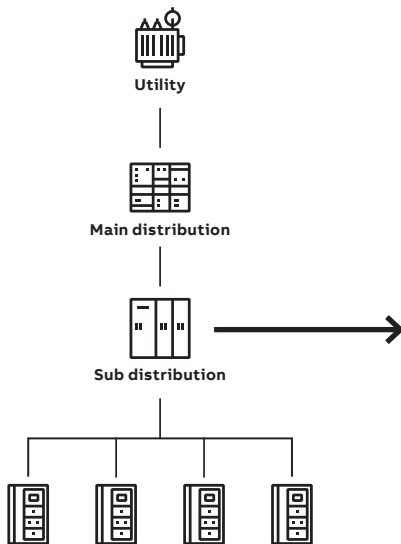
[Download the Application Note](#)

Click on the link or scan the QR Code to download the related application note that includes a sample architecture with its list of components (Bill of Material - BOM)

ABB intelligent distribution provides further insights for a clear understanding of energy consumption and other, non-electrical parameters (e.g. water, gas, temperature) not only at main distribution level but down to sub-distribution and load level as well. Acquire more insights and start monitoring energy flows in sub-distribution boards with System pro M Compact® InSite. This range of connected devices has been specifically developed to support energy and asset management requirements by collecting data from various devices, such as energy and power meters, network

analyzers, EQmatic for independent meter integration (electricity, gas, water or heat) in addition to protection devices like MCBs and RCDs equipped with current sensors and integrated additional digital input and output modules. Not to mention everything that can be monitored via ABB Ability™ Energy Manager & ABB Ability™ Asset Manager, BMS or SCADA systems or even 3rd party systems via API. Typical examples of sub-distribution board components and architecture for greenfield and existing installations (brownfield) are given below.

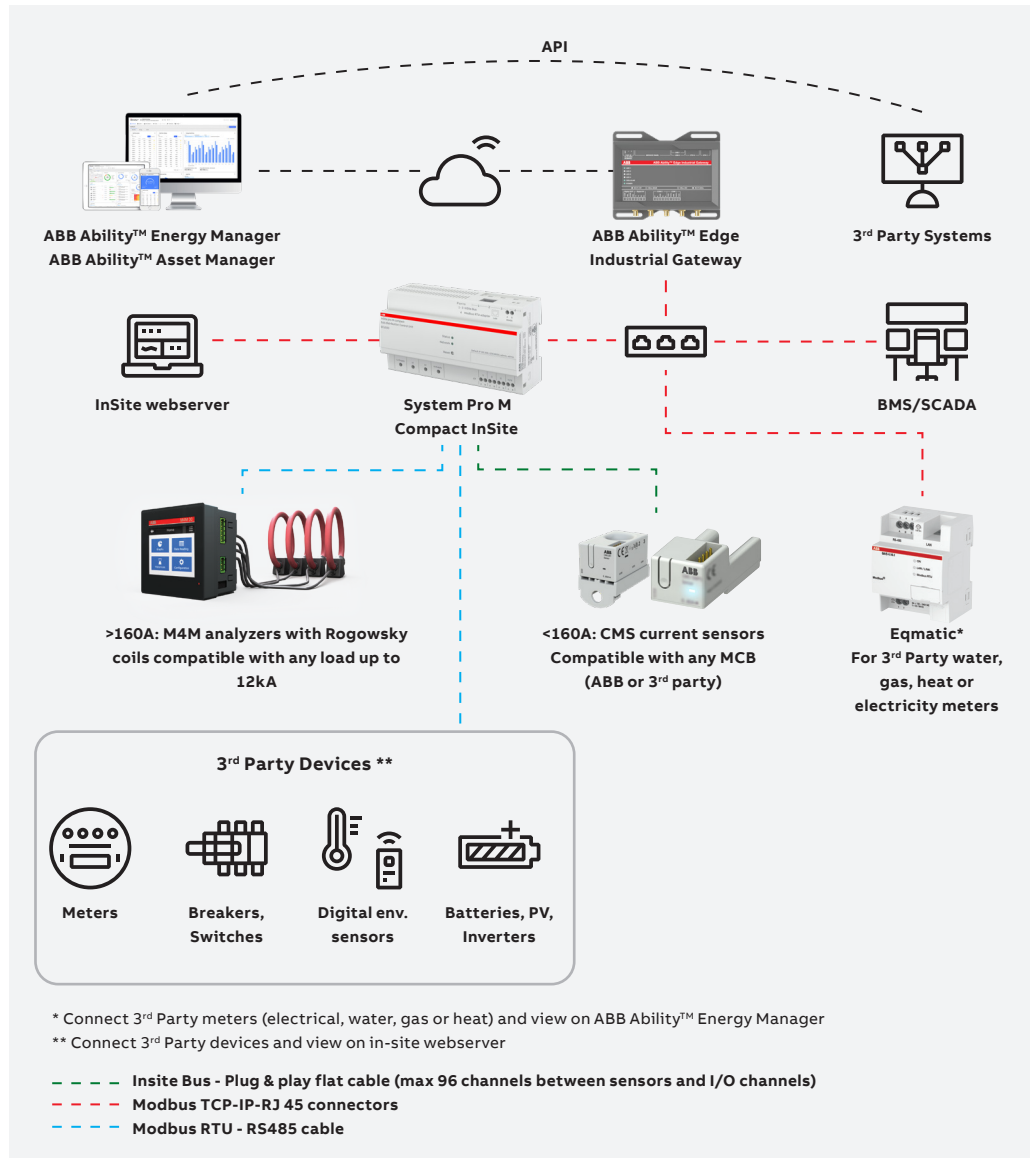
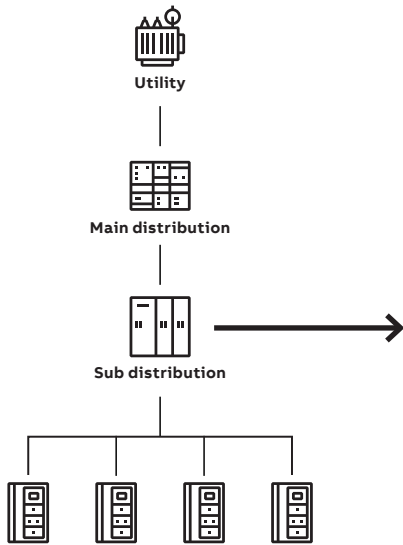
Greenfield Application



* Connect 3rd Party meters (electrical, water, gas or heat) and view on ABB Ability™ Energy Manager

** Connect 3rd Party devices and view on in-site webservice

Brownfield Application



Main Components



[System Pro M Compact® InSite](#)



[S200 Miniature Circuit Breaker](#)



[M4M Network Analyzer](#)



[ABB Energy Meter](#)



[ABB EQmatic Energy Analyzer](#)



[ABB Ability™ Edge Industrial Gateway](#)



[ABB Ability™ Energy Manager](#)



[ABB Ability™ Asset Manager](#)

Critical Loads

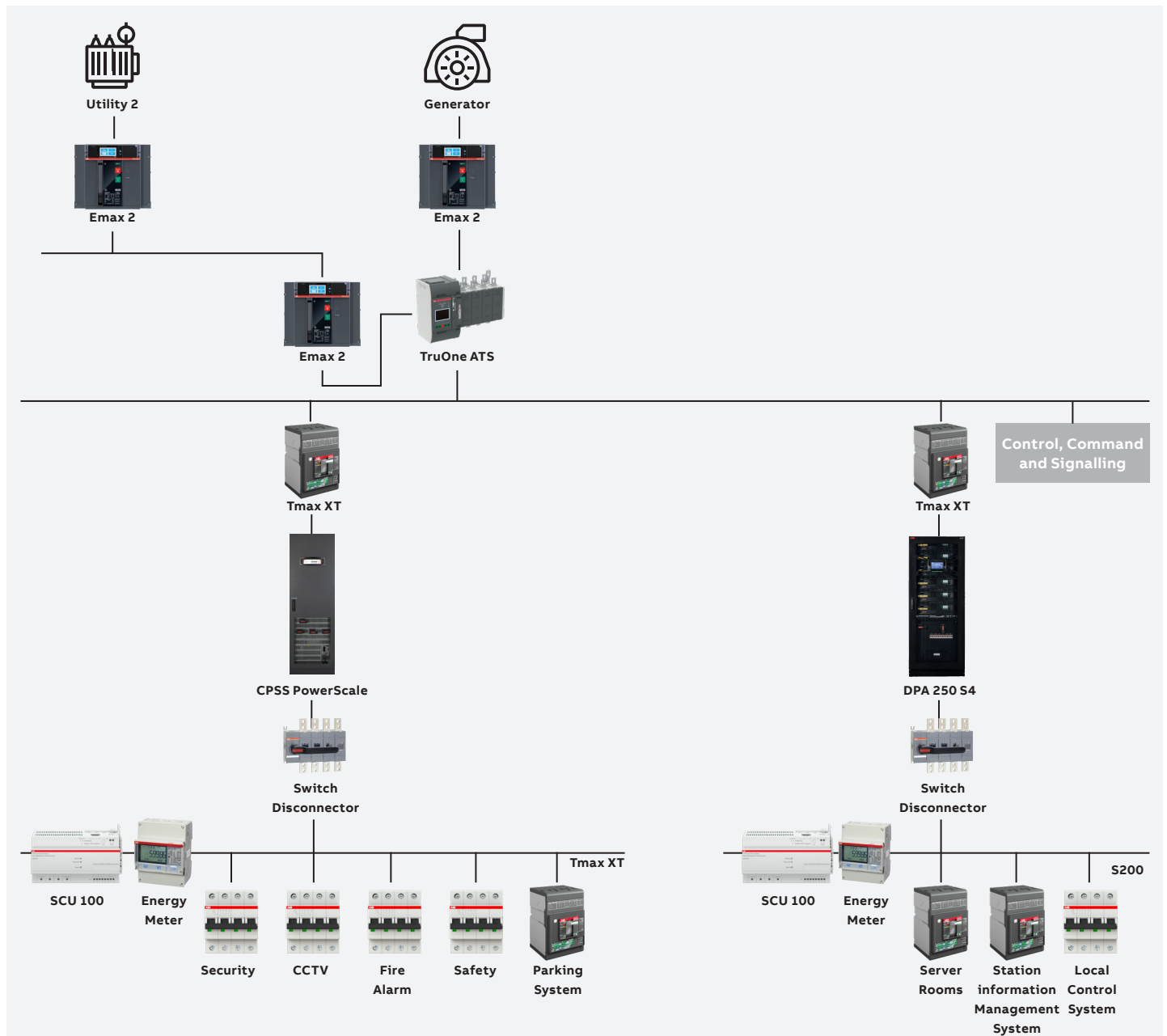


[Download the Application Note](#)

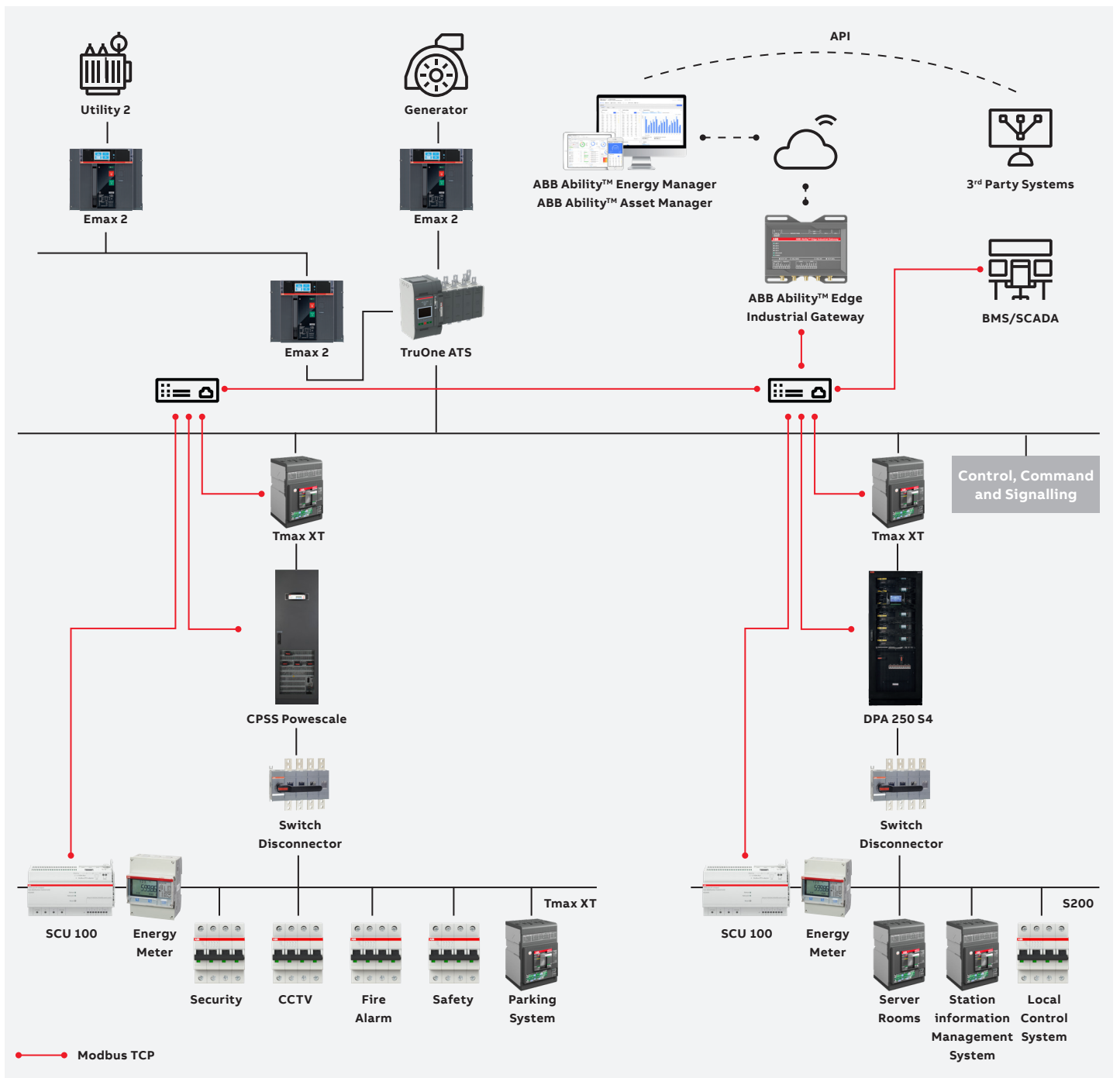
Click on the link or scan the QR Code to download the related application note that includes a sample architecture with its list of components (Bill of Material - BOM)

There are many critical loads in every passenger station. They typically require uninterrupted power of a suitable quality and cannot tolerate even the briefest lapse in power flow. These loads must also cope with abnormal electrical supply conditions if they are to support people safety, system reliability and security as well as the station information management system, emergency lighting, fire alarm system, CCTV, etc. Complete monitoring of such critical loads is crucial to ensuring reliability and continuity of operation. Compliant with standard EN50171, the PowerScale UPS can provide emergency power for emergency lighting, the fire alarm and security systems, while DPA 250 S4 UPS

copies with the server rooms, station information management and local control system. Other components include high-reliability Tmax XT molded-case breakers and S200 miniature circuit-breakers while System pro M Compact® InSite gathers data for branch measurement. ABB Ability™ Energy Manager & ABB Ability™ Asset Manager can easily monitor all this and more, while the architecture can be integrated with BMS, SCADA or 3rd party systems via API. The single-line diagram, communication architecture and relative main components of typical critical loads are illustrated in the example below.



Note : It's recommended to have dedicated power supply for each critical load to ensure independent reliability.



Main Components



[DPA 250 S4 Modular UPS](#)



[PowerScale 33 Standalone UPS](#)



[Tmax XT Molded Case Circuit Breaker](#)



[System Pro M Compact® InSite](#)



[S200 Miniature Circuit Breaker](#)



[ABB Energy Meter](#)



[ABB Ability™ Edge Industrial Gateway](#)



[ABB Ability™ Energy Manager](#)



[ABB Ability™ Asset Manager](#)

EV Charging Station

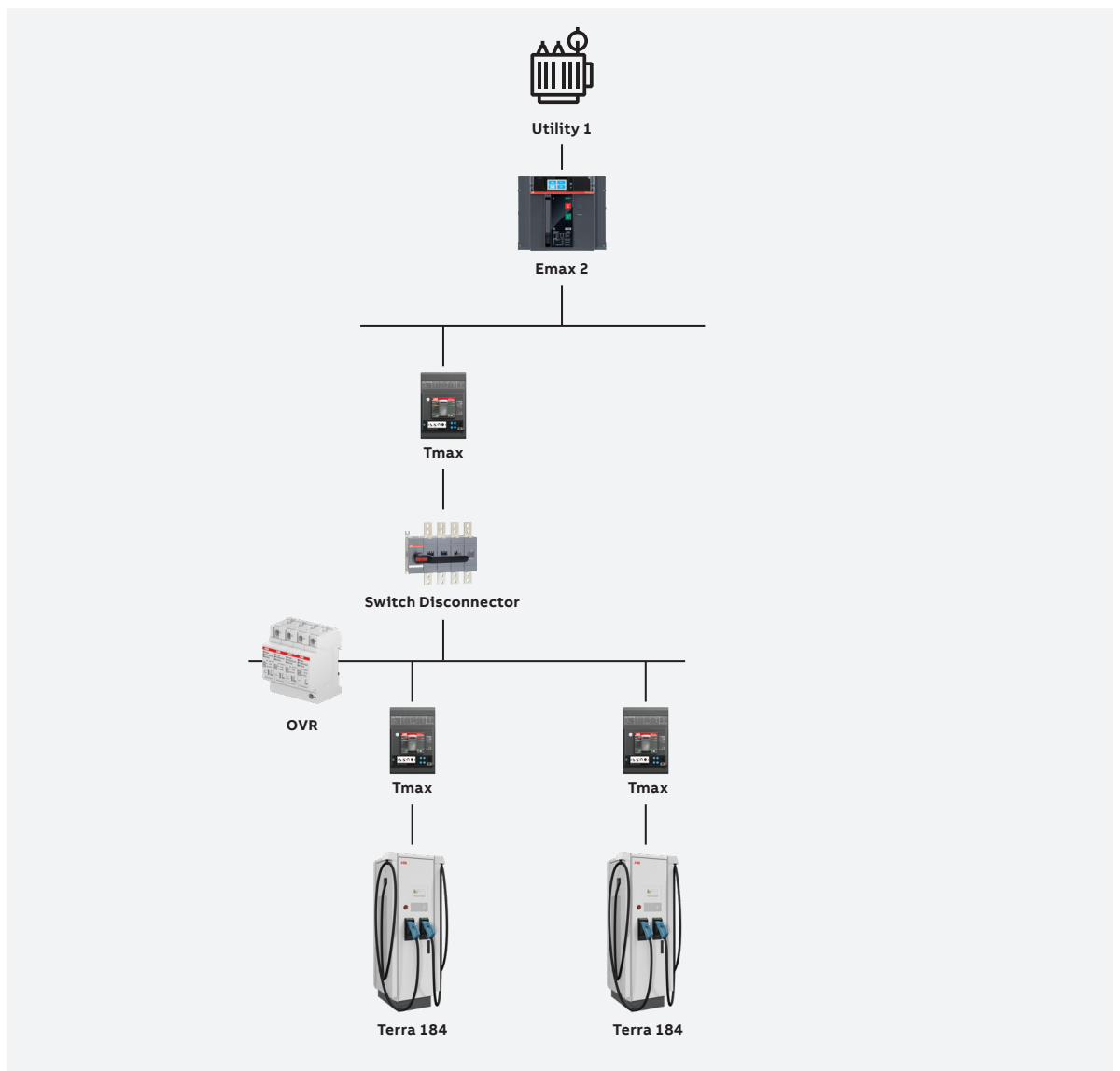


[Download the Application Note](#)

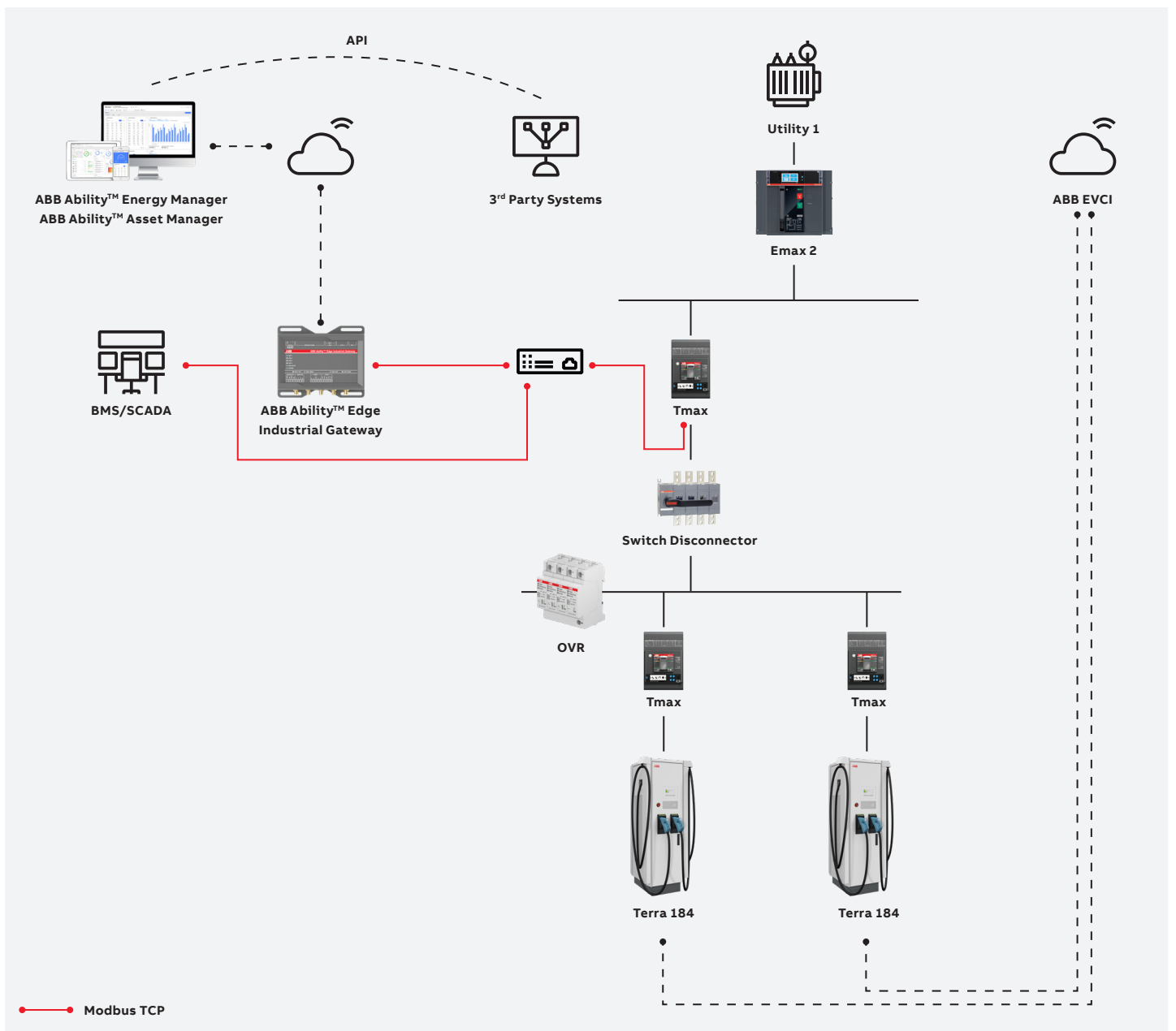
Click on the link or scan the QR Code to download the related application note that includes a sample architecture with its list of components (Bill of Material - BOM)

If smarter, reliable and emission-free mobility is to be ensured, an electric vehicle charging service, accessible to everyone, everywhere is crucial. Get ahead with the Terra 184 all-in-one fast charger. Then add protection devices, branch and energy monitoring systems, all easily connected to ABB Ability™ Energy Manager & ABB Ability™ Asset Manager and integrate the architecture with BMS, SCADA or 3rd party systems via API.

Include further insights on customer payments, statistics and access management, as well as troubleshooting and service tools, all of which come with the ABB Ability™ EVCI platform⁽¹¹⁾. The single-line diagram, typical communication architecture and main components for EV charging points are illustrated in the example below.



11. For more information about [ABB Ability™ EVCI platform](#)



Main Components



[Terra 184 Charger](#)



[Tmax XT Molded Case Circuit Breaker](#)



[ABB Ability™ EVCI](#)



[ABB Ability™ Edge Industrial Gateway](#)



[ABB Ability™ Energy Manager](#)



[ABB Ability™ Asset Manager](#)

Emergency Lighting

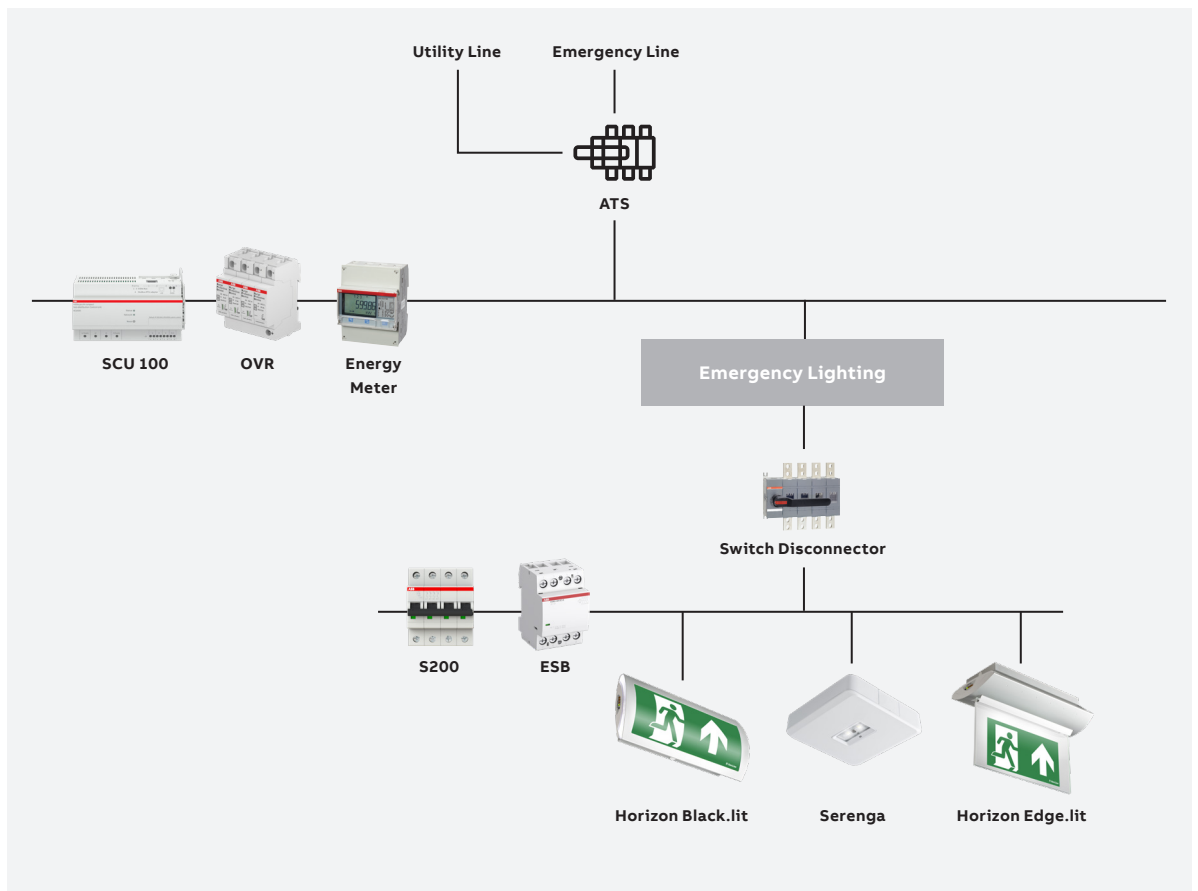


[Download the Application Note](#)

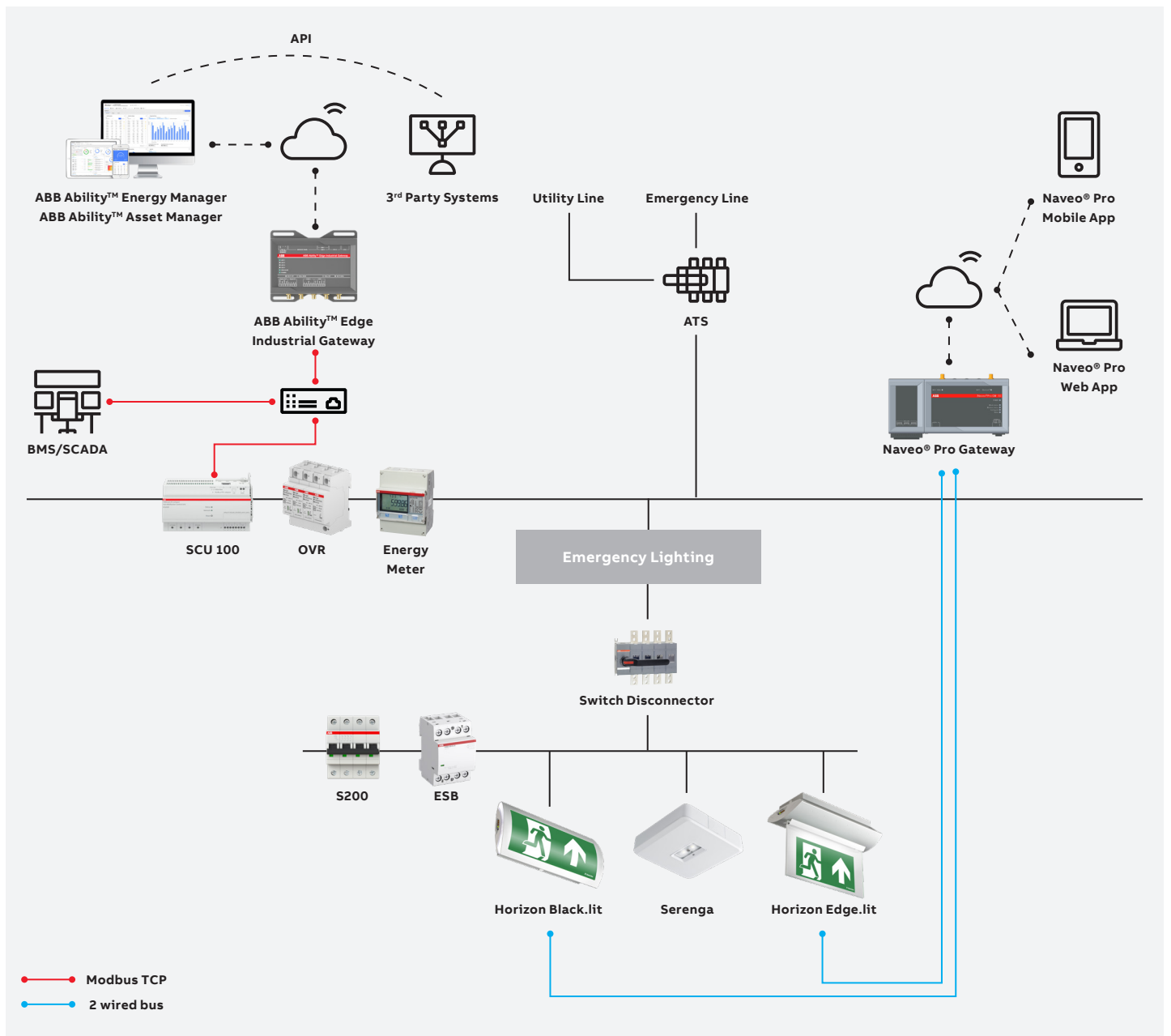
Click on the link or scan the QR Code to download the related application note that includes a sample architecture with its list of components (Bill of Material - BOM)

Emergency lighting is crucial for safety in every passenger station. It provides automatic lighting in evacuation scenarios created by abnormal conditions such as fire outbreaks or the absence of main power. ABB offers reliable solutions for escape route lighting, escape route safety signs, anti-panic lighting and high-risk area lighting. System pro M Compact® InSite enables the status of the emergency lighting panel and energy consumption

to be monitored and shares the data with ABB Ability™ Energy Manager & ABB Ability™ Asset Manager, BMS or SCADA. You can not only monitor but also control your emergency lighting directly with the Naveo®Pro mobile application or web interface. The single-line diagram, communication architecture and main components of a typical emergency lighting system are illustrated in the example below.



Note : Maintained emergency lighting system.



Main Components



[System Pro M Compact® InSite](#)



[S200 Miniature Circuit Breaker](#)



[ABB Energy Meter](#)



[Naveo®Pro](#)



[Horizon Emergency Lighting](#)



[Serenga2 Emergency Lighting](#)



[ABB Ability™ Edge Industrial Gateway](#)



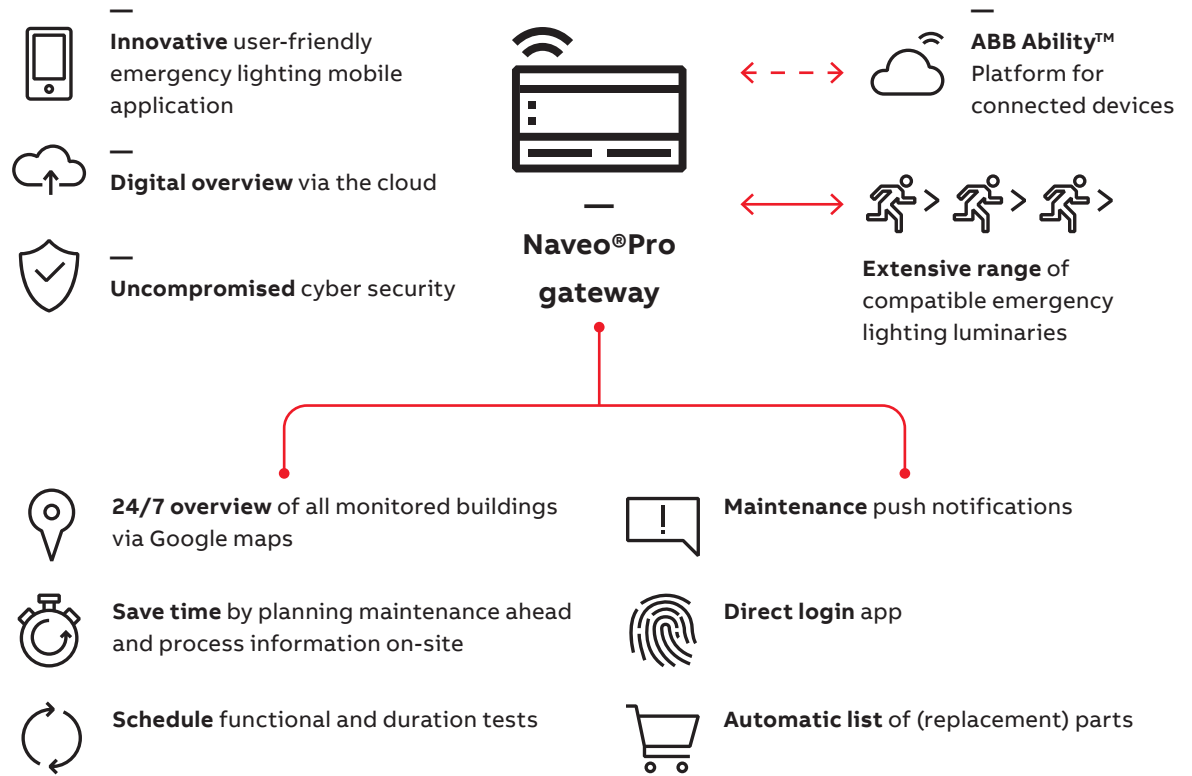
[ABB Ability™ Energy Manager](#)



[ABB Ability™ Asset Manager](#)

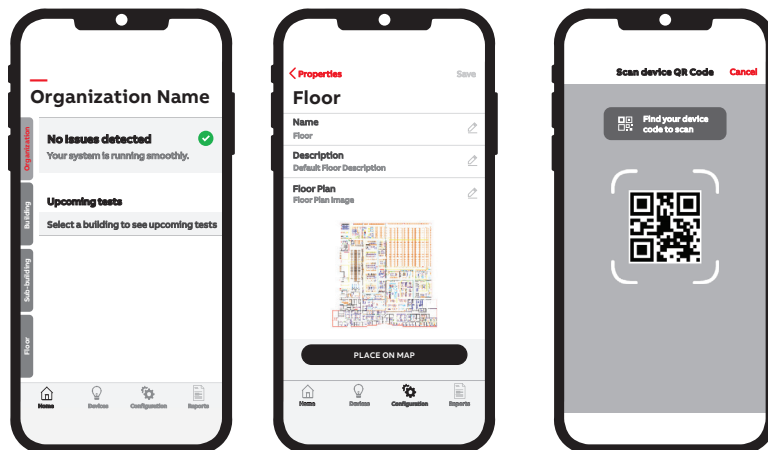
Naveo®Pro

Control your emergency lighting system




The Naveo®Pro smart monitoring system provides a digital overview via the cloud, giving instant information to assist resource planning and enhance building safety. This information can be processed directly using a mobile device, tablet or PC.


It gives a 24/7 overview of all monitored buildings via Google maps, status alerts, an automatic list of emergency lighting luminaires, documentation for increased availability and building safety, and enables data-driven planning for inspection, maintenance and installation.



 [Naveo®Pro - the smart emergency lighting solution - YouTube](#)

 [Naveo®Pro app overview - YouTube](#)

Main Components

 [ABB MyLearning](#)
(Commissioning and configuration of a Naveo®Pro gateway and addressable emergency lighting luminaires)

Fire Fighting Pump

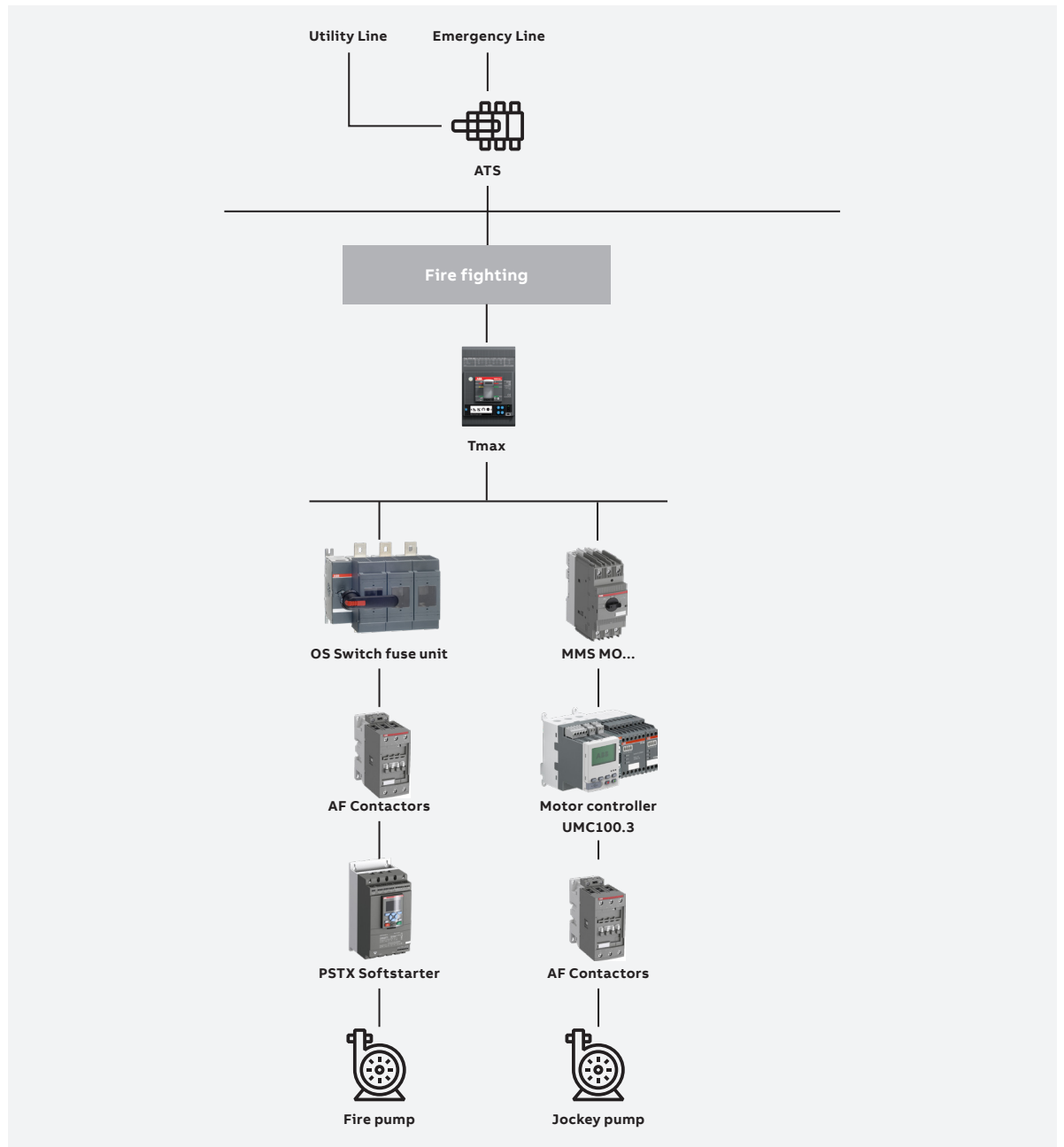


[Download the Application Note](#)

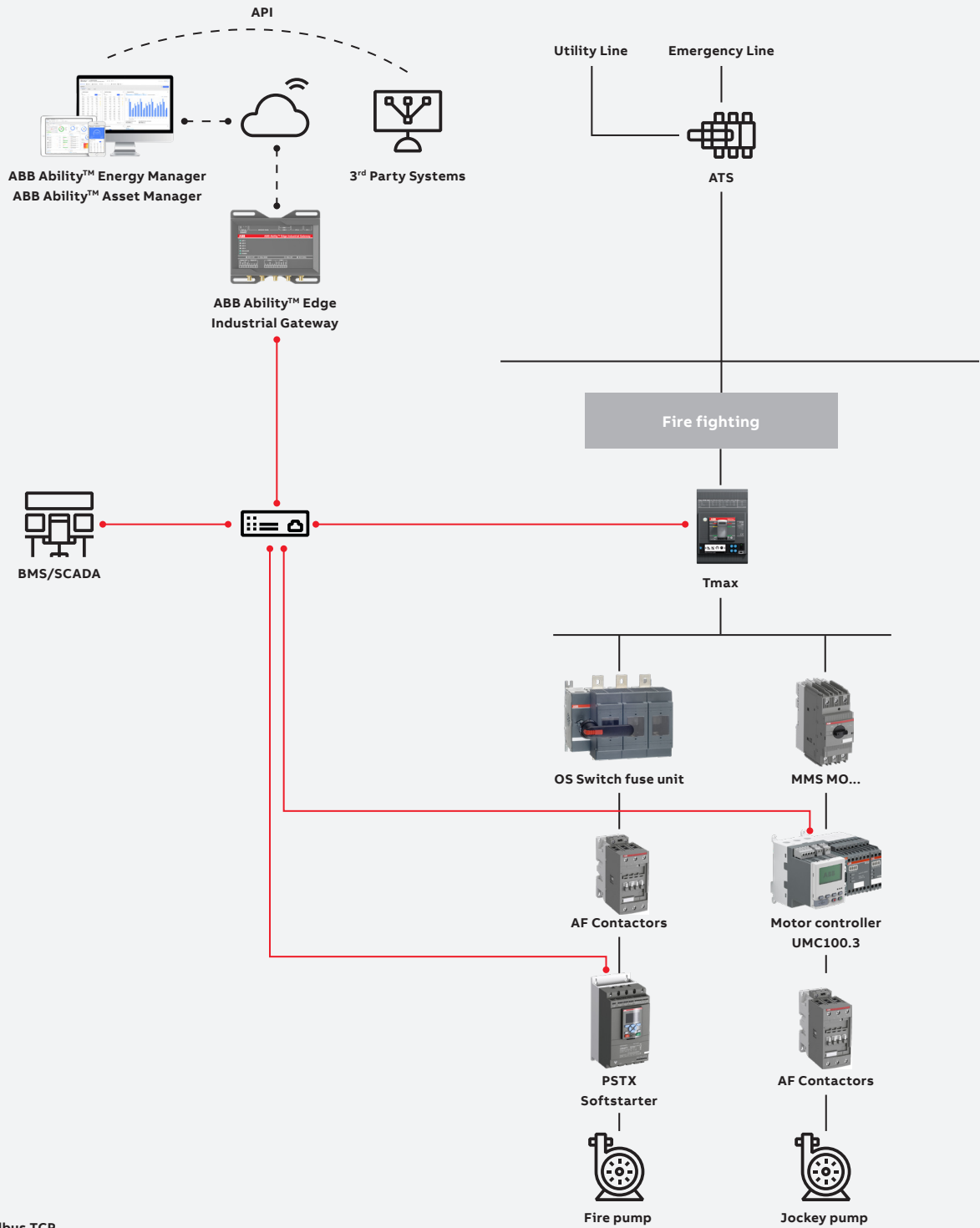
Click on the link or scan the QR Code to download the related application note that includes a sample architecture with its list of components (Bill of Material - BOM)

Fire safety is crucial in passenger stations, which are used daily by large groups of people. So much so, the stations are typically equipped with fire alarms and fire fighting systems. The motor control center (MCC) for the fire and jockey pumps is a critical part of a

fire-fighting system, thus monitoring the MCC can maximize safety and reliability. The digital architecture can be connected to ABB Ability™ Energy Manager & ABB Ability™ Asset Manager, BMS, SCADA or 3rd party systems via API.



Note: Installation of a manual DOL bypass (with contactor and overload relay) for the fire and jockey pumps is recommended to provided support in the case of maintenance.



Main Components



[PSTX Soft Starter](#)



[UMC100.3 Motor Controller](#)



[Manual Motor Starter](#)



[ABB Ability™ Edge Industrial Gateway](#)



[ABB Ability™ Energy Manager](#)



[ABB Ability™ Asset Manager](#)

Dewatering Pump

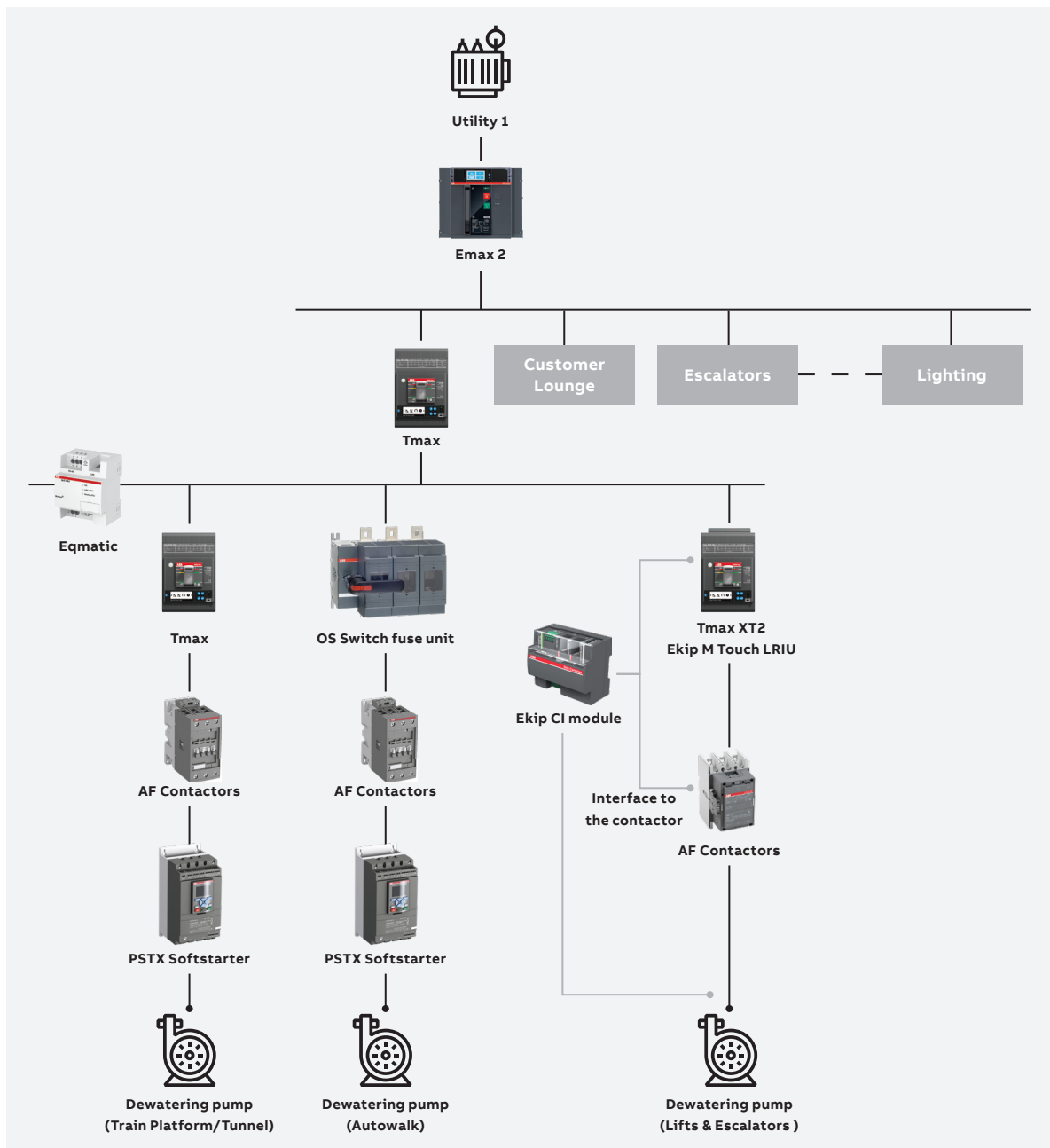


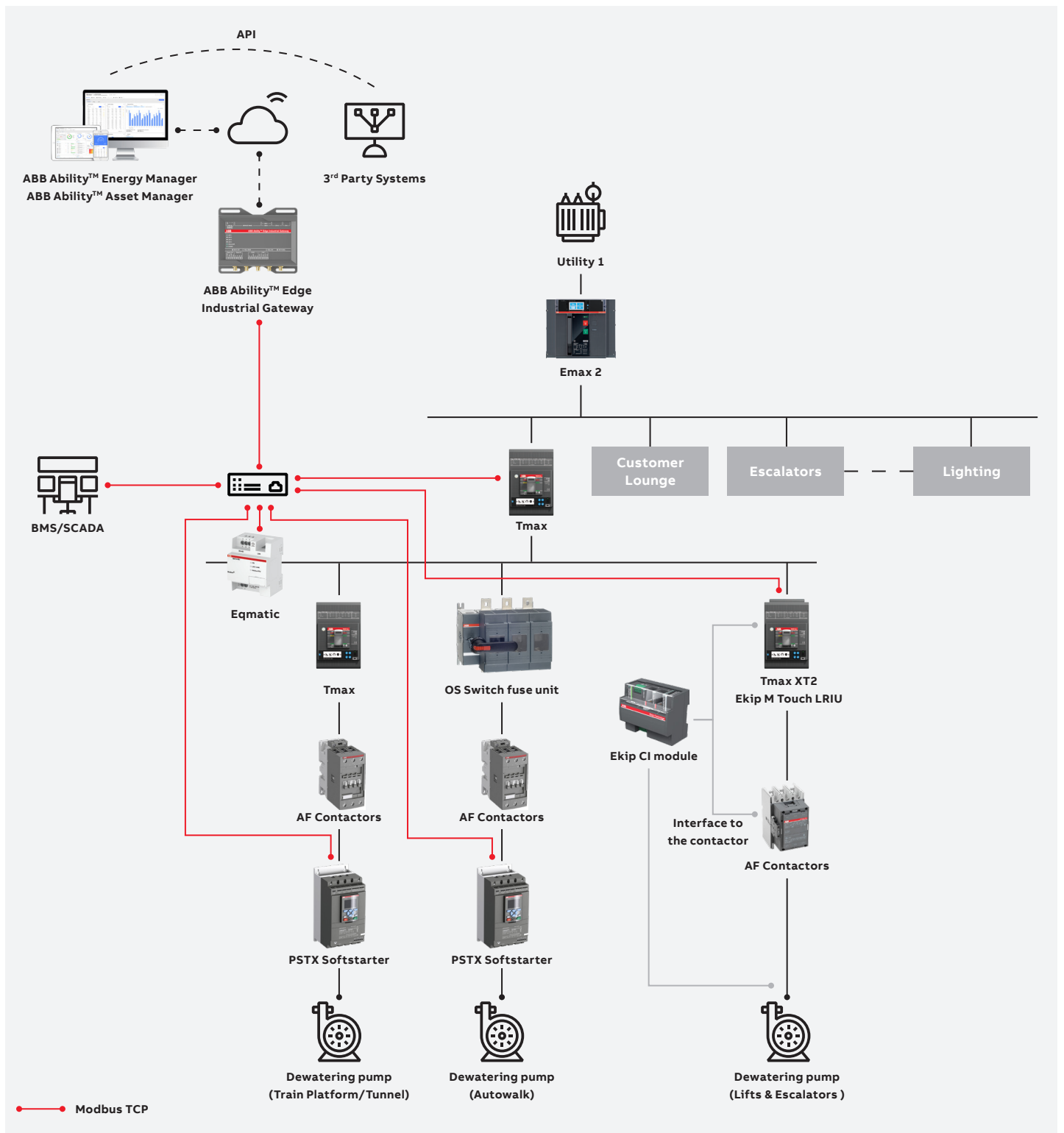
[Download the Application Note](#)

Click on the link or scan the QR Code to download the related application note that includes a sample architecture with its list of components (Bill of Material - BOM)

Typically, passenger stations also require dewatering pumps to prevent flooding and allow water to be rapidly pumped from platforms, tunnels, escalators or elevators following leaks or heavy rain.

Monitoring the MCC can maximize safety and reliability. The digital architecture can be connected to ABB Ability™ Energy Manager & ABB Ability™ Asset Manager and to BMS, SCADA or 3rd party systems via API.





Main Components



[PSTX Soft Starter](#)



[AF Contactors](#)



[Manual Operated Switch Fuses](#)



[ABB Ability™ Edge Industrial Gateway](#)



[ABB Ability™ Energy Manager](#)

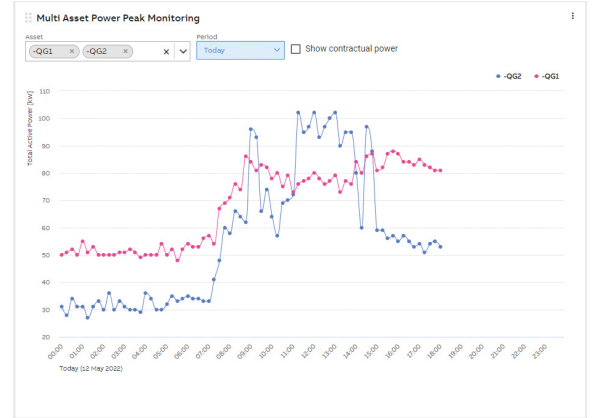
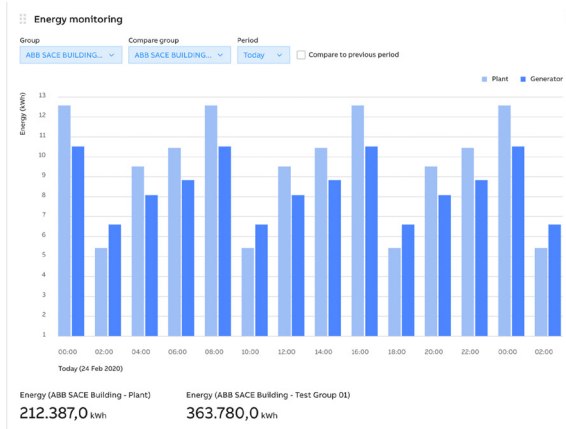


[ABB Ability™ Asset Manager](#)

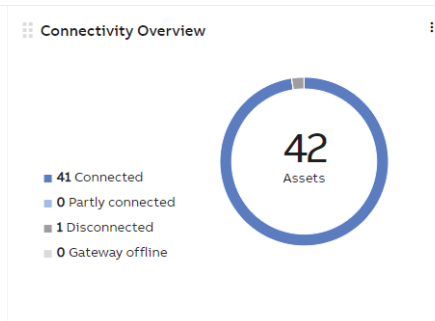
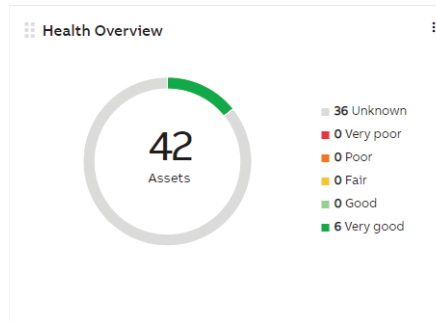
Annex

ABB intelligent distribution applications are the way to achieve safe, smooth rail operations, maximize energy efficiency, minimize running costs and downtime, thereby ensuring 24/7 continuous operation. All this and more thanks to digital capabilities, smart analytics, predictive maintenance

and energy & asset optimization. Comprehensive monitoring solutions for both single and multiple passenger stations thanks to ABB Ability™ Energy Manager (Watching Edition)⁽¹²⁾ and ABB Ability™ Asset Manager⁽¹³⁾.



Solutions for easily monitoring energy consumption, asset power trends, health overviews and the connectivity status of the electrical devices.



12. For more information about [ABB Ability™ Energy Manager cloud solution and subscriptions](#)

13. For more information about [ABB Ability™ Asset Manager cloud solution and subscriptions](#)

Use customizable widgets to obtain real time data monitoring of electrical parameters and more

Real time power

Asset: Select asset... All Favourites

DEVICE	P (KW)	Q (KVAR)	S (KVA)	
C1 52-A1	-185,0	-40,0	-189,27	★
C1 52-A3	182,0	43,0	187,01	★
C1 QF21	84,0	23,0	87,09	★
C1 QF28	186,0	36,0	189,45	★
C1 QF35	31,0	17,0	35,36	★
C1 QF36	N.A.	N.A.	N.A.	★
C1 QF42	53,0	0,0	53,0	★
C1 QF43	33,0	25,0	41,4	★
C1 QF45	N.A.	N.A.	N.A.	★
C1 52-A1	-185,0	-40,0	-189,27	★
C1 52-A3	182,0	43,0	187,01	★
C1 QF21	84,0	23,0	87,09	★
C1 QF28	186,0	36,0	189,45	★
C1 QF35	31,0	17,0	35,36	★

Page 1 / 18 < >

Real time voltage

Asset: Select asset... All Favourites

DEVICE	U12 (V)	U23 (V)	U31 (V)	
C1 QF35	393,0	393,0	394,0	★
C1 QF36	393,0	393,0	394,0	★
C1 QF42	392,0	391,0	391,0	★
C1 QF43	393,0	391,0	392,0	★
C1 QF45	0,0	0,0	0,0	★
C1 QF49	401,0	339,0	400,0	★
C1 QF51	0,0	0,0	0,0	★
C1 QF52	395,0	394,0	394,0	★
C1 QF53	389,0	389,0	390,0	★
C1 QF35	393,0	393,0	394,0	★
C1 QF36	393,0	393,0	394,0	★
C1 QF42	392,0	391,0	391,0	★
C1 QF43	393,0	391,0	392,0	★
C1 QF45	0,0	0,0	0,0	★

Page 1 / 18 < >

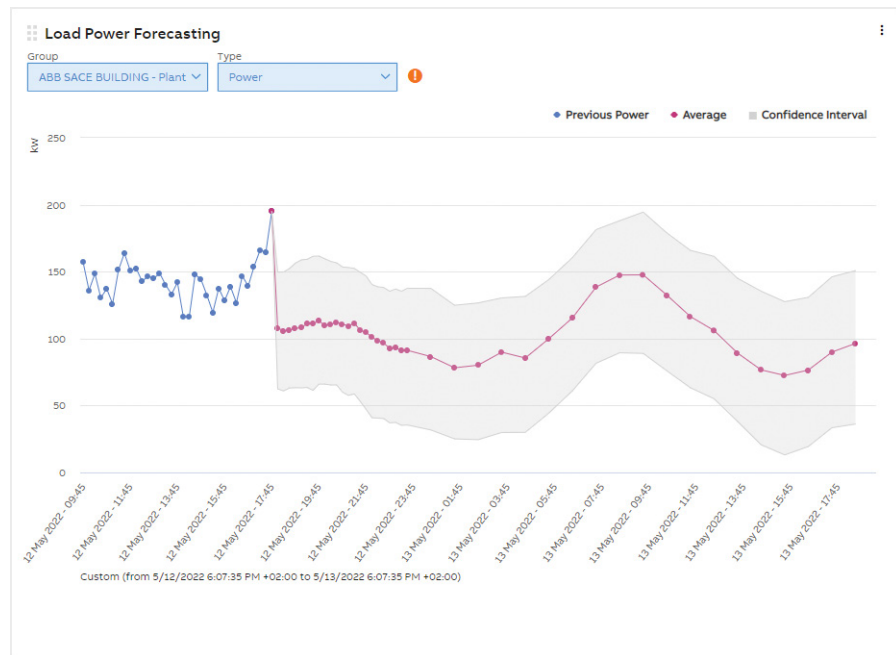
Real time currents

Asset: Select asset... All Favourites

DEVICE	IL1 (A)	IL2 (A)	IL3 (A)	
C1 52-A1	288,0	279,0	279,0	★
C1 52-A3	290,0	279,0	270,0	★
C1 QF21	160,0	78,0	155,0	★
C1 QF28	295,0	281,0	271,0	★
C1 QF35	54,0	51,0	53,0	★
C1 QF36	0,0	0,0	0,0	★
C1 QF42	80,0	78,0	85,0	★
C1 QF43	66,0	52,0	71,0	★
C1 QF45	0,0	0,0	0,0	★
C1 52-A1	288,0	279,0	279,0	★
C1 52-A3	290,0	279,0	270,0	★
C1 QF21	160,0	78,0	155,0	★
C1 QF28	295,0	281,0	271,0	★
C1 QF35	54,0	51,0	53,0	★

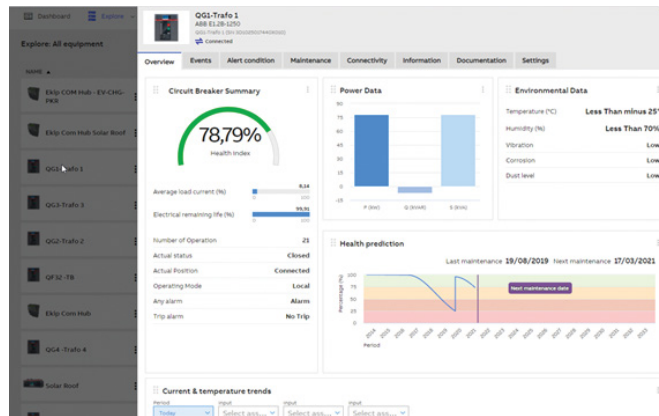
Page 1 / 18 < >

More intelligence with load power forecasting⁽¹⁴⁾ thanks to smart analytics



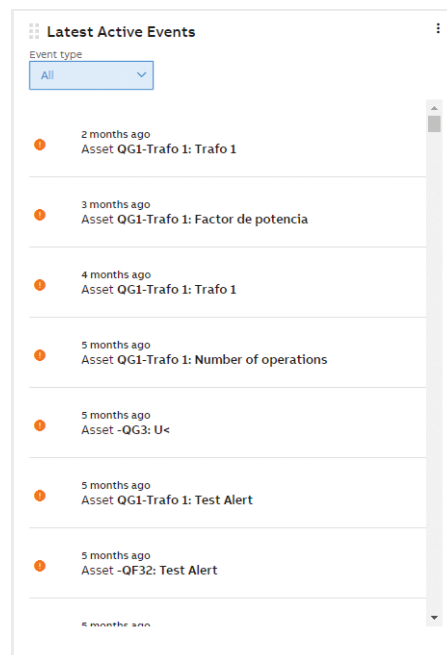
Optimize asset management and avoid downtime with comprehensive overviews and actionable

insights as well as predictive maintenance⁽¹⁵⁾ for 24/7 continuous operation.



Track energy consumption and costs, and compare with current or previous periods for suggested improvements and savings.

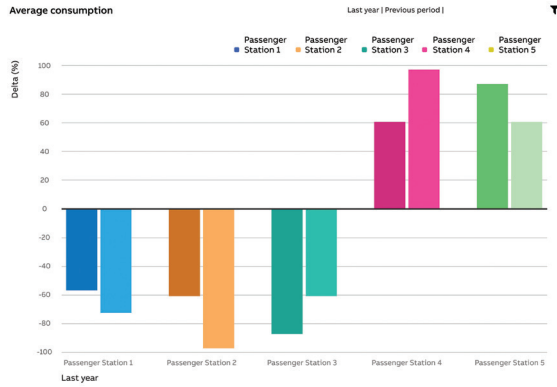
Receive instantaneous alerts about any abnormal event in the station on your mobile, tablet or PC via SMS or email.



The screenshot shows an 'Energy Cost Comparison' table for the 'Current month'.

ASSETS	CURRENT (€)	PREVIOUS (€)
test	-	-
G4	320,13	-
prova	3.481,44	10.968,9
Elevator	52,49	90,6
General Services	83,98	67,2
Auxiliary	2.374,08	7.132,8
Conditioner & chiller	2.013,03	6.223,2
Chargers	88,01	87,6
Generators	1.500,34	2.099,4
Mains	12.667,49	30.166,8
Plant	11.167,15	28.067,4

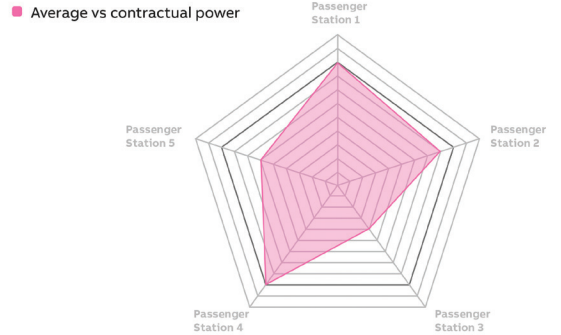
Monitor and analyze the energy consumption of multiple stations so that actions can be taken in stations requiring further improvements in terms of efficiency.



Save costs by analyzing the average power used and adjusting your contractual power agreements.

Power usage index

May 2021 | All sites

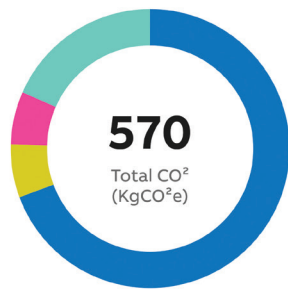


Obtain ISO5001 certification by monitoring energy consumption in stations for predefined group processes, general and auxiliary services.

Reduce carbon footprint by comparing CO2 emissions and taking actions.

CO² production

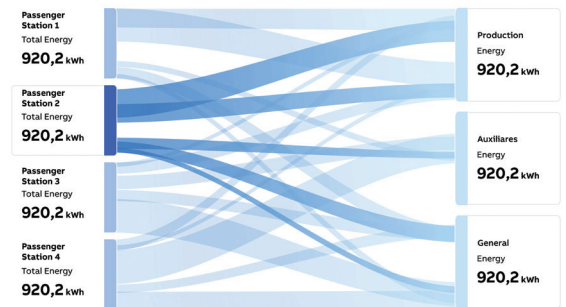
May 2021 | All sites



SITES ▲	CO ² (KGCO ₂ E)	PREV. PERIOD
Passenger Station 1	150	-2%
Passenger Station 2	64	-
Passenger Station 3	20	+20%
Passenger Station 4	115	-8%

Energy flow

Last month | All sites



To discover more

APPLICATION FINDER



Find the reference architecture tailored to your needs and speed up your project thanks to our new Application Finder Tool!



CONTACT US



Do you have a similar project and are you searching for the right Application configuration? Contact us and talk to our experts!



RATE US



Your opinion matters! Let us know if you found the document useful and how can we improve!



ABB S.p.A.
Electrification Business Area
Smart Power Division
5, Via Pescaria
I-24123 Bergamo - Italy
Phone: +39 035 395.111

new.abb.com/low-voltage

We reserve the right to make technical changes and modify the contents of this document without prior notice. With regard to purchase orders, the agreed particulars shall prevail. ABB AG declines all and every liability for potential errors or possible lack of information in this document.

We reserve all rights to this document and to the subject matter and illustrations contained therein. All reproduction, disclosure to third parties or utilization of these contents – in whole or in part – is forbidden without the prior written consent of ABB AG. Copyright© 2023 ABB
All rights reserved