



EcoStruxure™ Power for Airport Industry (IEC)

Drive Digital Transformation and Enable Net Zero Airports
Using our Innovative Solutions for Electrical Distribution



2026/05

EcoStruxure™
Innovation At Every Level **Power**

Schneider
Electric

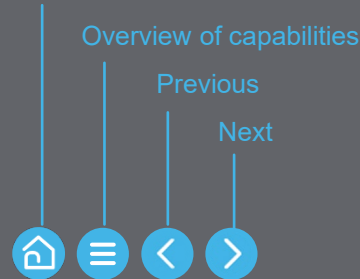
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SECTION 2 – How EcoStruxure Power
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Purpose of the Document

Target Audience

This document is intended to address Design Firms, End Users, Engineering, Operations and Maintenance, Consultants, Specifiers, EPCs and Service teams, and other qualified personnel.

Objective

To understand how EcoStruxure Power for Airports can help improve electrical safety, power reliability and sustainability across the Airports.

The document provides insight into airport industry challenges and explores solutions for addressing pain points associated with building sustainable airports of the future.



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SECTION 1: Introduction to the Airport
Industry

Introduces the market, trends, and key challenges of the airport industry.

SECTION 2: How EcoStruxure Power
Can Support the Airport Industry

Describes the solutions that Schneider Electric, and more specifically EcoStruxure Power, provides for the Airport industry, with typical electrical and digital architectures.

SECTION 3: Digital Solutions & Services

Provides information about EcoStruxure Power capabilities for the airport industry, sorted by value proposition:

- [Overview of Digital Solutions Services](#)
- [Capabilities to Build Faster and Flexible Infrastructure](#)
- [Capabilities to Improve Safety and Availability](#)
- [Capabilities to Operate Electrical Networks Efficiently](#)
- [Capabilities to Decarbonize Airport Infrastructure](#)
- [Transverse Lifecycle Capabilities](#)

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Contains useful documents and links to find out more about capabilities and applications across the industry.



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Airport Industry Market Outlook

Airport Industry Trends

Airport Industry Challenges

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SECTION 1

Introduction to the Airports Industry

WHY READ THIS SECTION?

The objective of this section is to:

- Introduce the Airport Industry
market outlook and trends
- Present the main challenges of
the Airport Industry



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Airport Industry Market Outlook

Airport Industry Trends

Airport Industry Challenges

SECTION 2 – How EcoStruxure Power Can Support the Airport Industry

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Airport Industry Market Outlook

An evolving industry moving towards Net Zero



Move towards Net Zero

300+

airports part of ACI (Airport Council international) signed up to achieve Net Zero by 2050

Airport Electrification



5x

the electrical power demand expected by 2050 versus current need



Power Outage Impacts

150M\$

power outage at the operation center of Delta Airlines in 2016

Rising Cyber Attacks



460B\$

in annual global costs due to cyberattacks (IATA estimation)



Global Passenger Traffic

25B

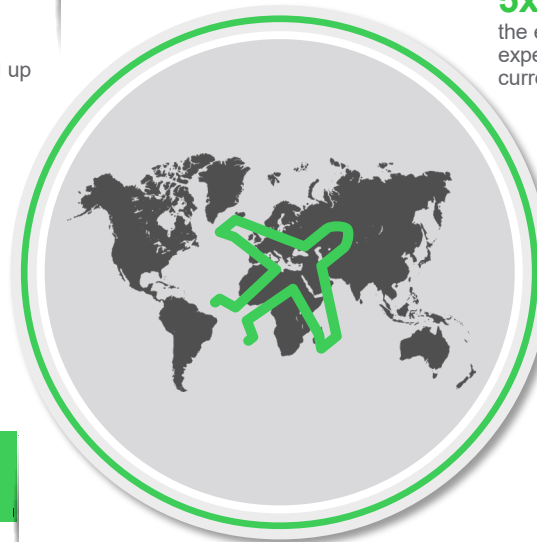
passenger traffic by 2052, nearly 2.5x the 2024 projections

Sustainable Transportation



700M€

invested by the European Union in sustainable, safe and smart transportation infrastructure





Sources

Commitment translated into action: over 300 European airports lead the charge to net zero CO2 emissions under their control

<https://www.aci-europe.org/netzero/media-centre/500-commitment-translated-into-action-over-300-european-airports-lead-the-charge-to-net-zero-co2-emissions-under-their-control.html>

Calculating the cost of downtime

<https://www.atlassian.com/incident-management/kpis/cost-of-downtime#:~:text=In%20August%202016%2C%20a%20five,%24150%20million%20for%20Delta%20Airlines.>

The trusted source for air travel demand updates

<https://aci.aero/2024/02/13/the-trusted-source-for-air-travel-demand-updates/#:~:text=Global%20passenger%20traffic%20is%20expected,2.5%20times%20the%202024%20projection.>

Electrifying Airport Ecosystems by 2050 Could Require Nearly Five Times the Electric Power Currently Used

<https://www.enterprisemobility.com/en/news-stories/news-stories-archive/2024/01/electrifying-airport-ecosystems-could-require-significantly-more-power.html#:~:text=Electrifying%20Airport%20Ecosystems%20by%202050,the%20Electric%20Power%20Currently%20Used&text=Enterprise%20Mobility%20and%20Xcel%20Energy,that%20contribute%20to%20their%20ecosystems>

Assessing the Rising Importance of Cyber Security in the Aviation Industry

<https://www.coforge.com/what-we-know/blog/assessing-the-rising-importance-of-cyber-security-in-the-aviation-industry>

EU invests record €7 billion in sustainable, safe and smart transport infrastructure

https://transport.ec.europa.eu/news-events/news/eu-invests-record-eu7-billion-sustainable-safe-and-smart-transport-infrastructure-2024-07-17_en



Airport Industry Trends

Four key trends driving the airport market

Increasing Traffic

Global passenger traffic expected to reach **25 billion in 2052** from **8.7 billion in 2023**^[1]. As of 2023 there were **187 greenfield airport** projects under way or planned globally^[2].



Modernization

There were **514** projects at **existing** airports globally with an aggregate investment of **USD489 billion** (2023)^[2].

Increasing Cyberattacks

61.5% of airports in an ACI survey confirmed that they had been **targeted** by cyberattacks in 2020^[3]. Many governments and administrations, like US TSA^[4], issue cybersecurity **regulations** for airports.



Decarbonization

Global aviation accounts for **2.5%**^[5] of total global **CO2 Emissions**. Airports contribute **2%** of this^[6]. The global aviation industry commits to reaching **Net Zero** by **2050**^[7].

Sources

[1] [ACI airport traffic outlook 2024](#)

[2] [CAPA Centre for Aviation News Nov 2023](#)

[3] [ACI World Insights 2021](#)

[4] [TSA News 2023](#)

[5] [Our World Data 2020](#)

[6] [ACI Airport Carbon Accreditation site](#)

[7] [IATA members' pledge](#)

Airport Industry Challenges

Five key challenges impacting the airport market



Increasing Power Demand

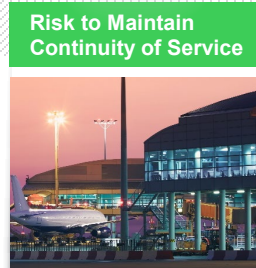
Growing passenger traffic requires expanding Airport infrastructure which leads to increasing power demand.

On top of this decarbonization initiatives often involve electrification which leads to further increases in power demand.



Increasing Cyber Attacks

Many governments consider their country's airports to be critical infrastructure and are legislating to ensure that they protect themselves from cyber attack.



Risk to Maintain Continuity of Service

Keeping airport infrastructure in good working order is vital to the smooth operation of the airport.

Maintenance must also be carried out in a safe and efficient manner to minimize its impact on operations.



Workforce Turnover

Older experienced workers are retiring, and it is difficult to find enough skilled replacement workers.



Accelerating Decarbonization

Airports need a realistic roadmap in place to reach Net Zero by 2050.

They also need to determine the most appropriate decarbonization initiatives and execute them in a cost-effective manner.

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Airport Industry Challenges ▶

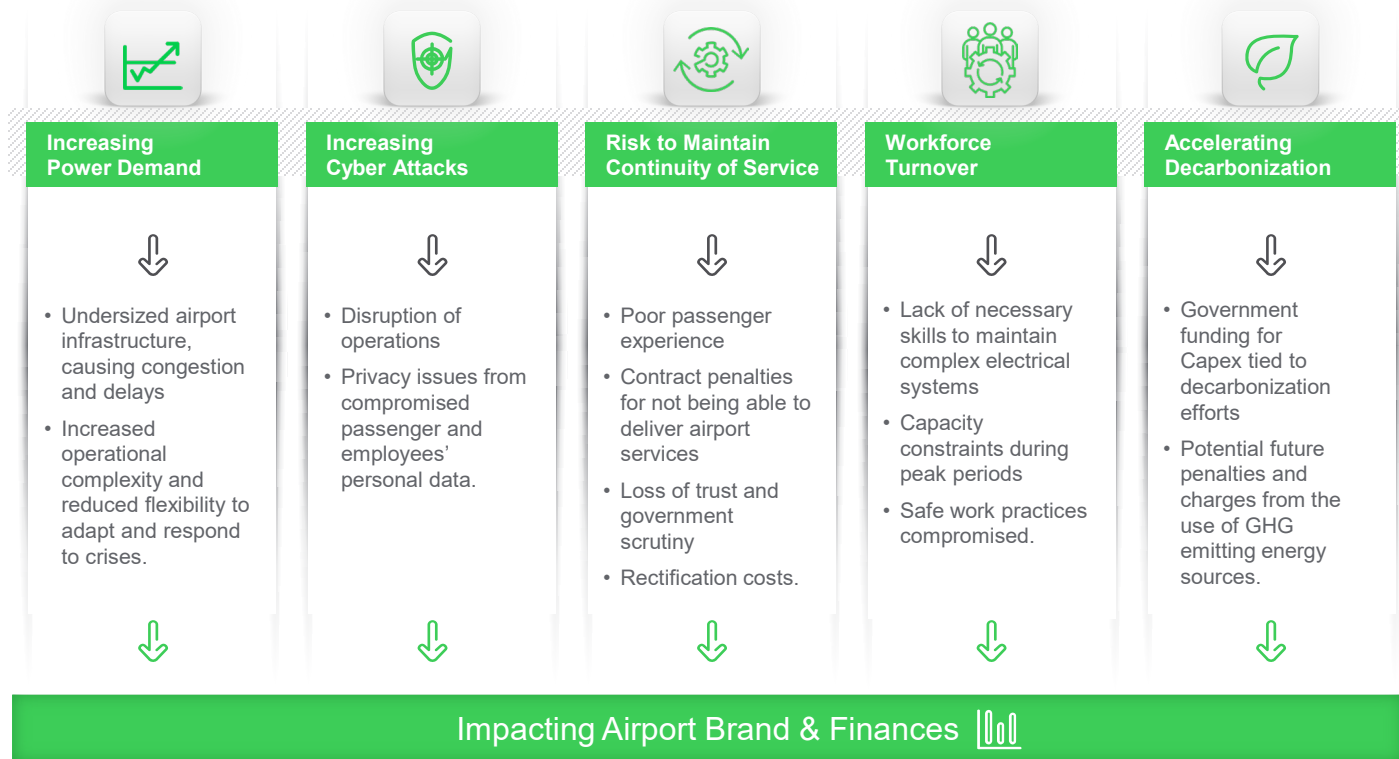
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Airport Industry Challenges

Implication for the airports



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EcoStruxure Power Solutions for Airports

Example of Airport Infrastructure

Proposed Electrical and Digital Architectures

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SECTION 2

How Schneider Electric Can Support Airport Infrastructure

WHY READ THIS SECTION?

The aim of this section is to:

- Present Schneider Electric **value propositions** to meet Airport Infrastructure challenges.
- Explain how **Schneider Electric** with **EcoStruxure Power solutions** can **support** this industry.
- Provide an **example** of electrical and digital architectures.



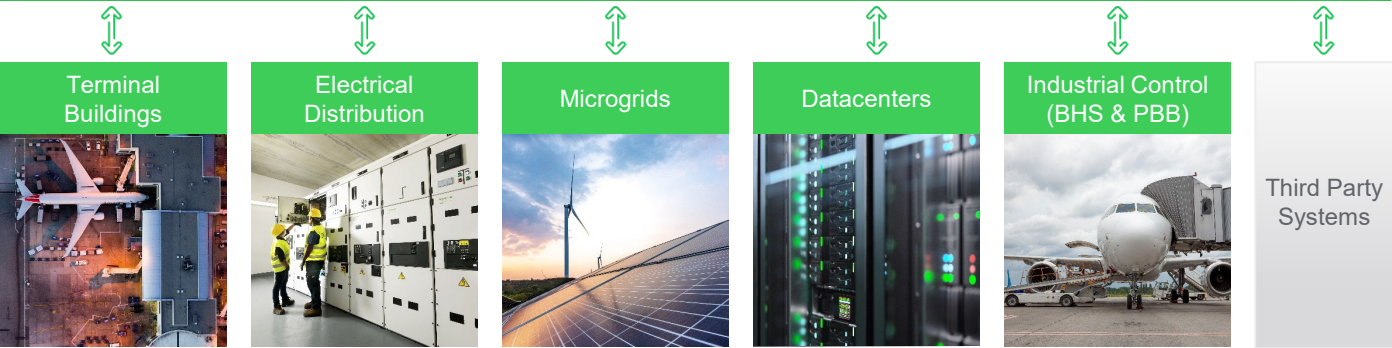
Schneider Electric Solutions for Airport Infrastructure

Main areas of the airport supported by Schneider Electric

Airports are complex with many areas and systems. Here are some key areas, where our solutions can help:



Central Operations



* Third party systems to be interfaced need to be checked for compatibility with UoC.

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Schneider Electric Solutions for Airport Infrastructure

Our value proposition is based upon three pillars:

Reliable Electrification



- **Modernize** electrical distribution for more reliable infrastructure with a digital twin to maintain integrity over time
- **Maintain** infrastructure using digital support services for peace of mind
- Implement a **Microgrid** to allow independence from the Grid
- Supply **UPS backup power** for critical assets.

Digitalization



- **Manage and maintain centrally** the airport's buildings and overall electrical infrastructure
- **Break siloes** and improve operator's effective collaboration with a Unified Operation Center
- Mitigate **OT Cybersecurity** risks
- Control and monitor **industrial processes** like Baggage Handling and Passenger Boarding Bridges.

Decarbonization



- **Define the airport decarbonization roadmap** towards net zero
- **Reduce scope 1:** Electrify buildings, Provide EV charging infrastructure
- **Reduce scope 2:** Optimize the use of onsite renewable, Improve Energy efficiency of Terminal buildings, source green energy
- **Extend lifespan & reduce waste** by modernizing electrical distribution asset.

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EcoStruxure Power Solutions for Airport Infrastructure

Our detailed value proposition for electrical distribution

Build Faster & Flexible Infrastructure



Speed up the “design, build, modernize and commission” phases of new facilities using:

- Standardized electrical distribution and digital architectures.
- Design simulation tools based on an Electrical Digital Twin solution.

Support Cybersecurity Implementation



- Select products designed with built-in cybersecurity technologies/ features.
- Work with Electrical distribution partners with robust internal processes.

Improve Safety & Availability



- Monitor the installation to detect faults before they occur for improved safety.
- Provide automatic power restoration and model digital twin to reduce downtimes.

Operate Electrical Networks Efficiently



Enhance the skills of the team with:

- Augmented reality
- Training in a digital twin environment.

Enhance workforce productivity with remote monitoring, analytics, as well as support from digital and field services.

Decarbonize Airport Infrastructure



- Define a feasible decarbonization roadmap.
- Monitor energy to make informed decisions.
- Integrate onsite renewables
- Adopt Electric Vehicle (EV) charging digital solutions for optimization...

Reliable Electrification

Digitalization

Decarbonization

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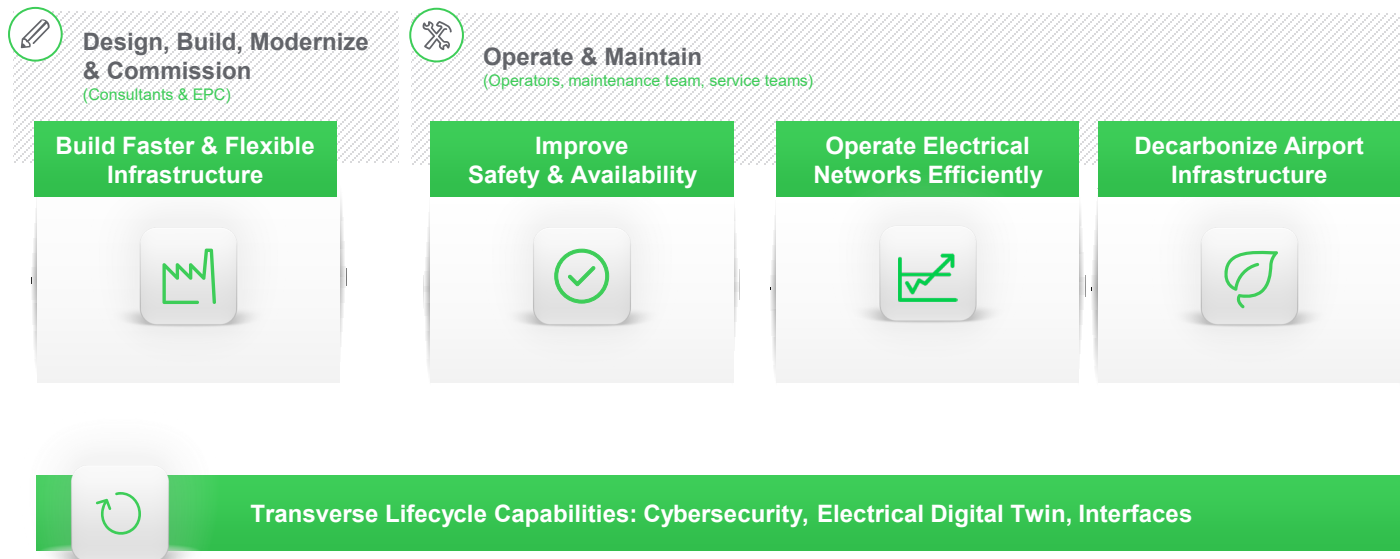
Proposed Electrical and Digital Architectures

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EcoStruxure Power Solutions for Airport Infrastructure

Lifecycle phases addressed by the value propositions presented previous page

Find details about EcoStruxure Power digital solutions and services in [SECTION 3](#)



EcoStruxure Power Solutions for Airport Infrastructure

Why consider EcoStruxure Power solutions for your Airport Infrastructure?



From **Airside** to **Landside** with
a focus on terminal buildings,



From **electrical design** to
operations and **maintenance**,

EcoStruxure Power helps deliver an
end-to-end digital solution for efficient,
reliable and safer Airport sites.

Our **collaborative environment**,
enhanced by the Electrical Distribution
Digital Twin for the Airport
Infrastructure, supports **reliable
operations**.

Example of Airport Infrastructure

Typical areas and systems



Example of an Airport Infrastructure

Breakdown of electricity consumption

Energy accounts for 10-15% of the operating budget for airport facilities with a major contributor being the electricity. Lighting and cooling accounts to almost 46% of overall electricity use in an airport.

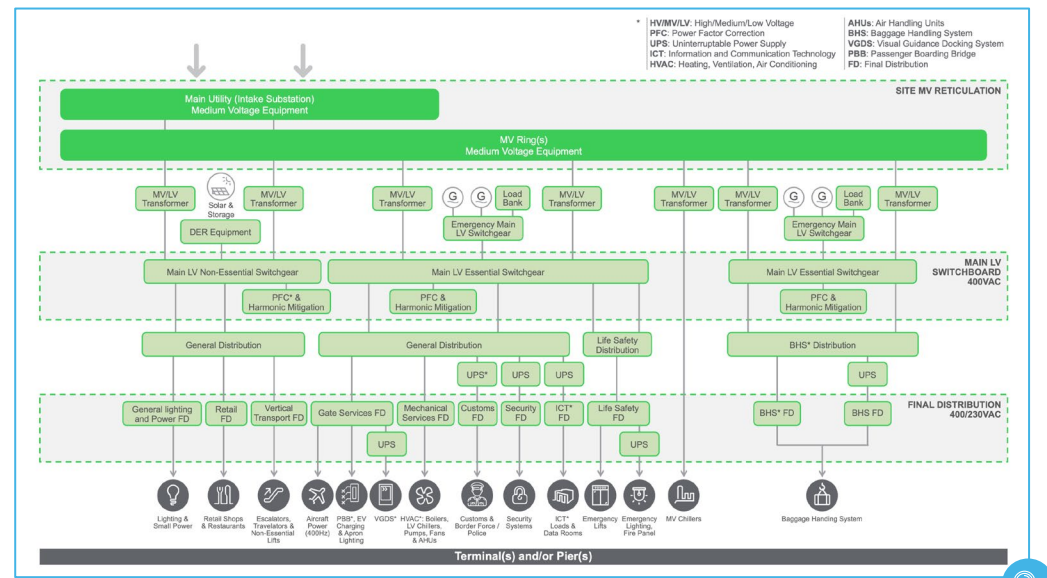


Source:

• <https://esource.bizenergyadvisor.com/article/airports>

Typical Electrical and Digital Architectures for an Airport Site

Typical electrical architecture

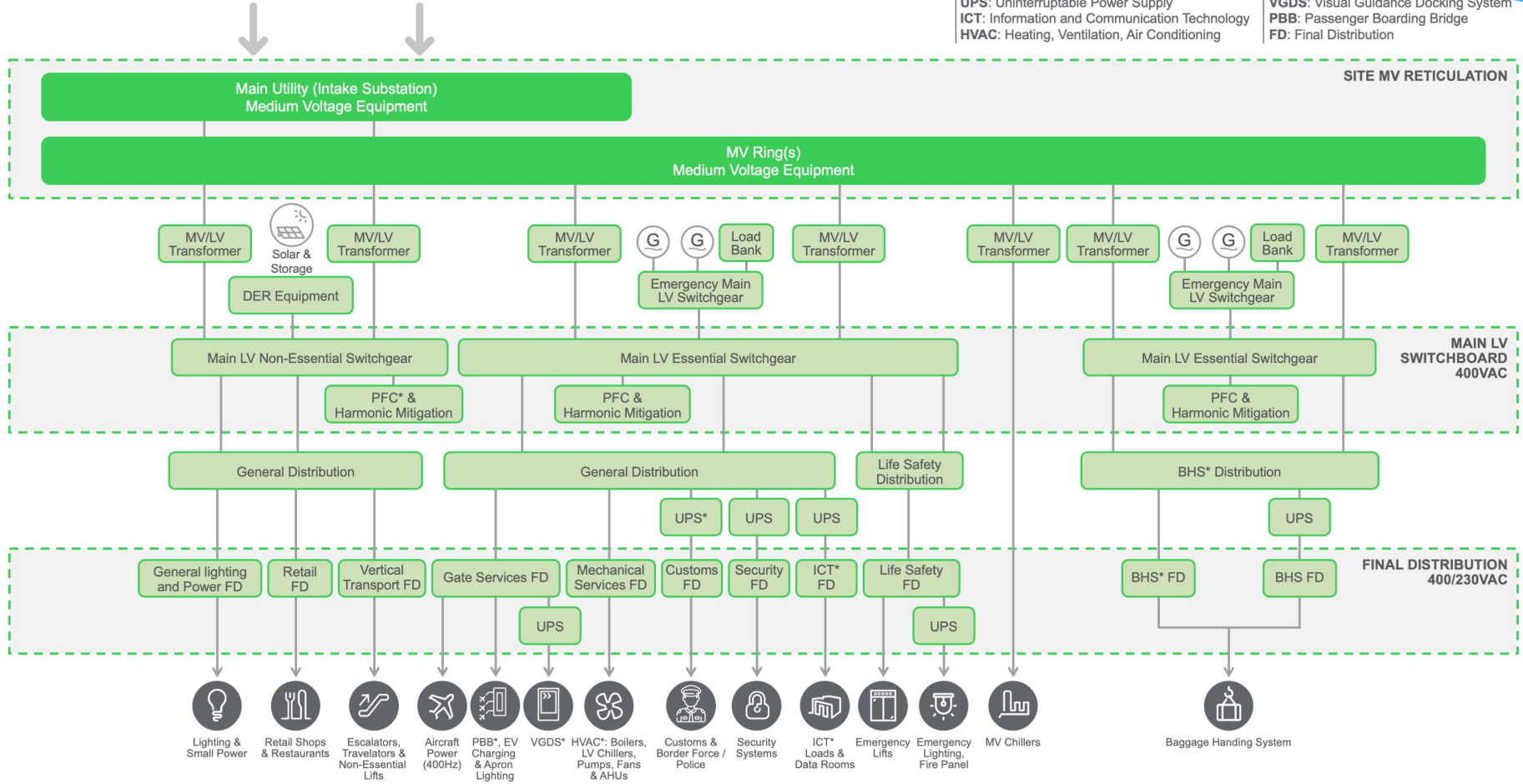


Example of Electrical Architecture

Example of Electrical Architecture

* HV/MV/LV: High/Medium/Low Voltage
PFC: Power Factor Correction
UPS: Uninterruptible Power Supply
ICT: Information and Communication Technology
HVAC: Heating, Ventilation, Air Conditioning

AHUs: Air Handling Units
BHS: Baggage Handling System
VGDS: Visual Guidance Docking System
PBB: Passenger Boarding Bridge
FD: Final Distribution



Terminal(s) and/or Pier(s)

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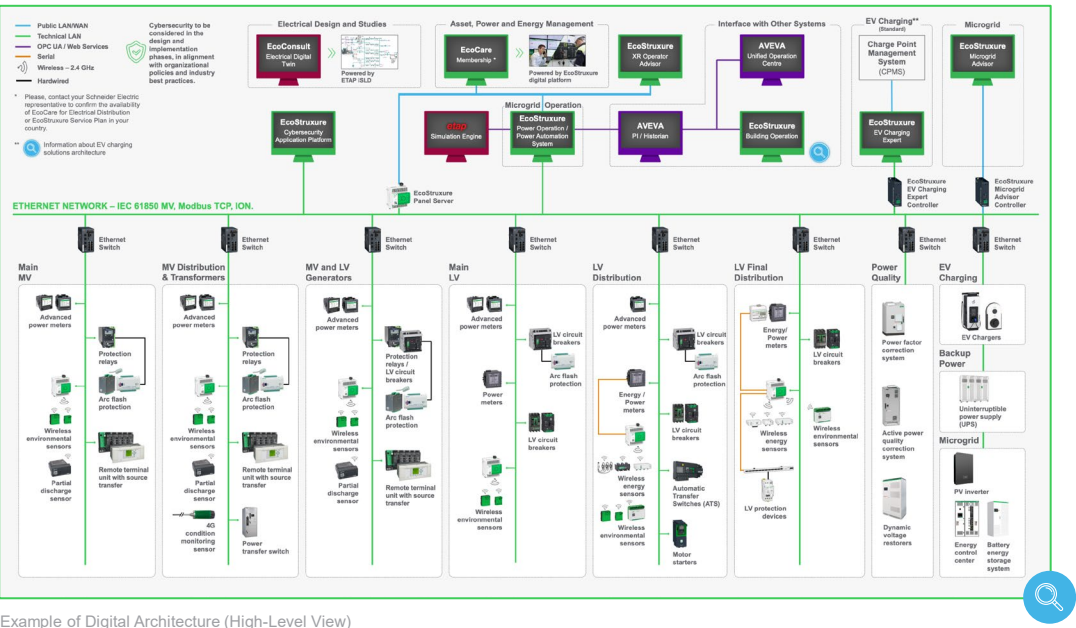
Proposed Electrical and Digital Architectures ▶

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Typical Electrical and Digital Architectures for an Airport Site

Suggested digital architecture (high-level view)



Example of Digital Architecture (High-Level View)

Example of Digital Architecture (High-Level View)

- Public LAN/WAN
- Technical LAN
- OPC UA / Web Services
- Serial
- Wireless – 2.4 GHz
- Hardwired

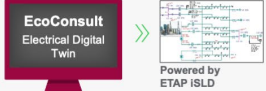


Cybersecurity to be considered in the design and implementation phases, in alignment with organizational policies and industry best practices.

* Please, contact your Schneider Electric representative to confirm the availability of EcoCare for Electrical Distribution or EcoStruxure Service Plan in your country.

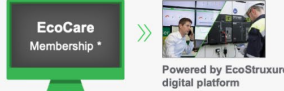
** Information about EV charging solutions architecture

Electrical Design and Studies

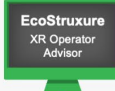


Powered by ETAP ISLD

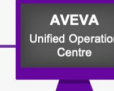
Asset, Power and Energy Management



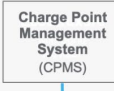
Powered by EcoStruxure digital platform



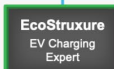
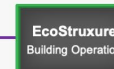
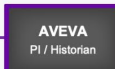
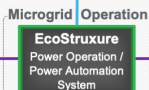
Interface with Other Systems



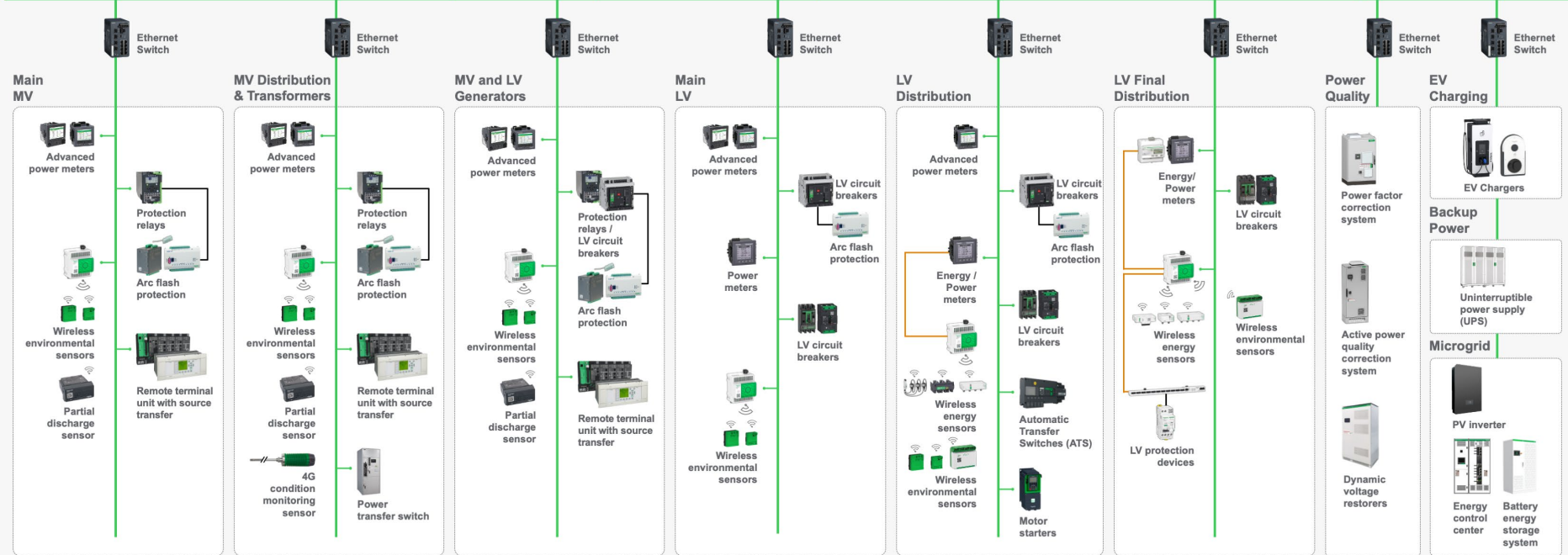
EV Charging** (Standard)



Microgrid



ETHERNET NETWORK – IEC 61850 MV, Modbus TCP, ION.



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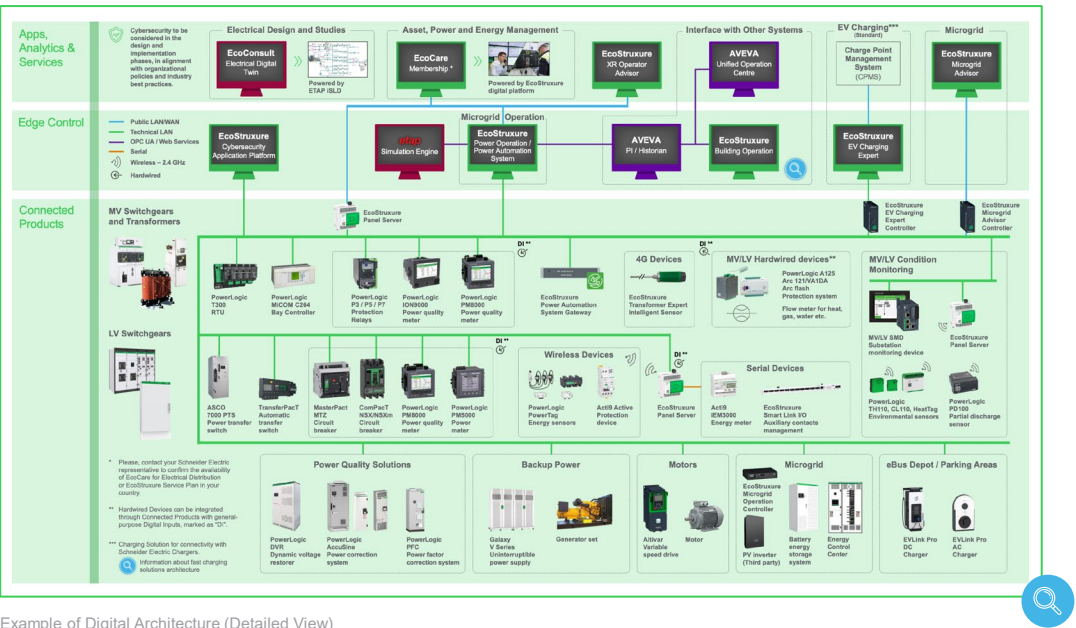
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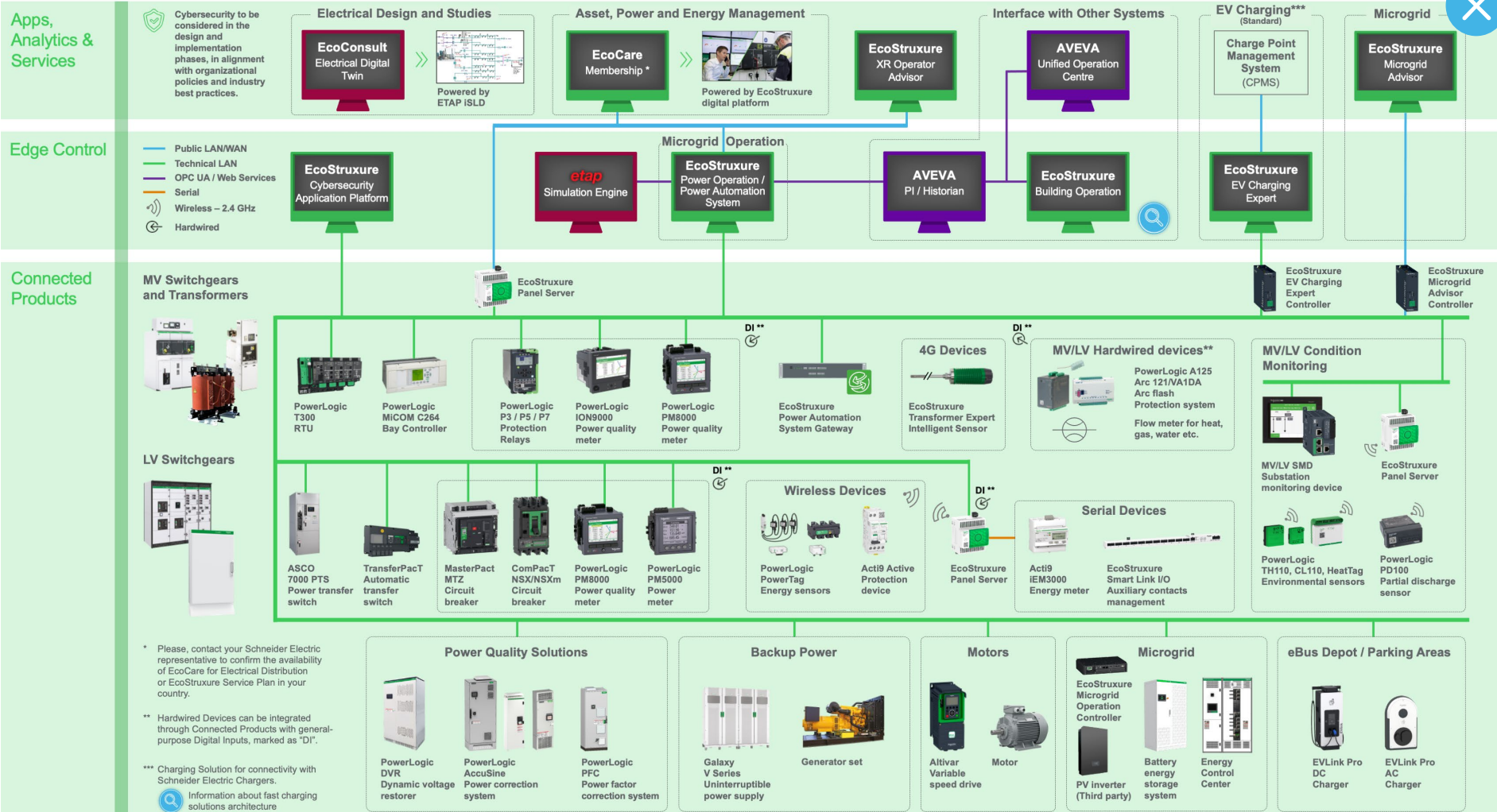
Typical Electrical and Digital Architectures for an Airport Site

Corresponding detailed digital architecture



Example of Digital Architecture (Detailed View)

Example of Digital Architecture (Detailed View)



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Capabilities to Improve Safety & Availability

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SECTION 3

Digital Solutions & Services

WHY READ THIS SECTION?

This section provides information about **EcoStruxure Power capabilities** for Airport Industries aligned to **industry challenges**.

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Introduction

EcoStruxure Power provides capabilities to support the challenges of Airport Infrastructure

**Design, Build, Modernize
& Commission**
(Consultants & EPC)**Build Faster & Flexible
Infrastructure**

These capabilities use standardized electrical distribution and digital design and simulation tools to speed up the "design, build, modernize and commission" phases of new facilities.

**Operate & Maintain**
(Operators, maintenance team, service teams)**Improve
Safety & Availability**

These capabilities help monitor installations to detect early malfunctions and/or limit fault consequences, improving safety and availability.

They also provide automatic power restoration and model digital twin modeling to reduce downtimes.

**Operate Electrical
Networks Efficiently**

These capabilities enhance operator's effectiveness and productivity while using tools like extended reality. They also help to build a skilled workforce.

**Decarbonize Airport
Infrastructure**

These capabilities implement effective energy monitoring, support renewable source integration and accelerate electrification across the precinct.

Transverse Lifecycle Capabilities

Digital Solutions that support "Design, Build, Operate & Maintain" phases of the entire project lifecycle in the Airport Infrastructure.

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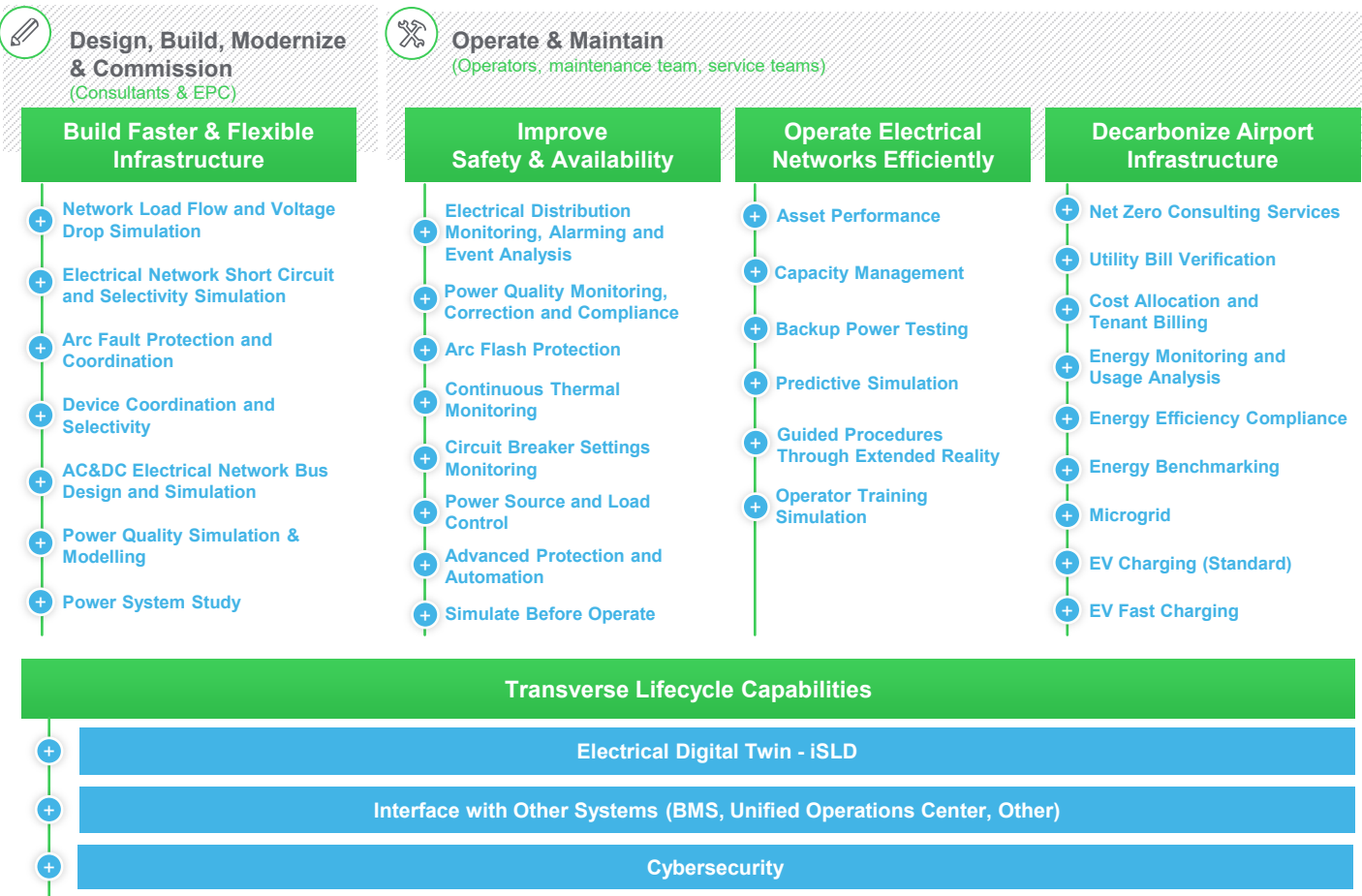
Capabilities to Decarbonize Airport Infrastruct.

Transverse Lifecycle Capabilities

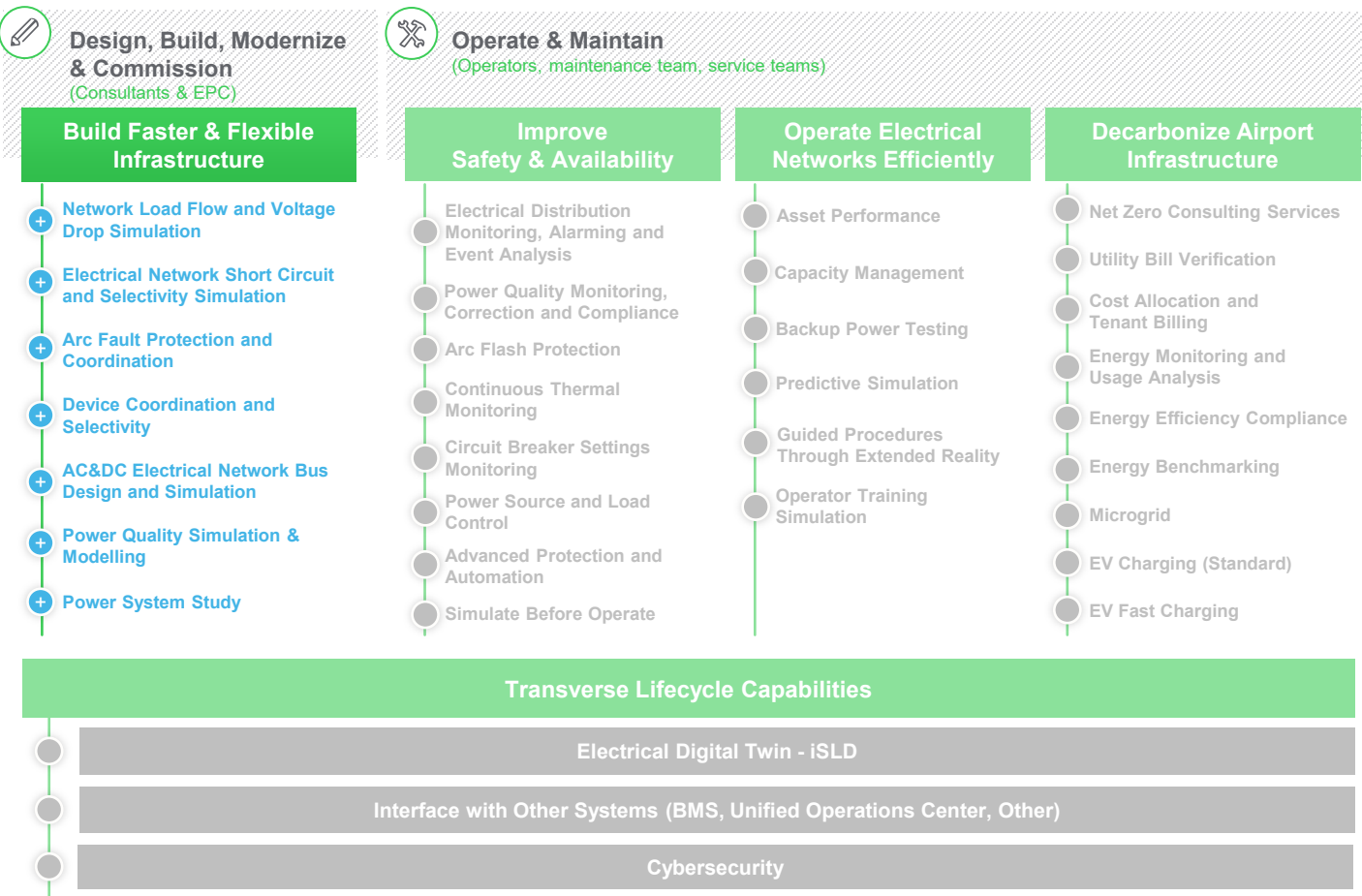
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Overview of Digital Solutions & Services



Capabilities to Build Faster and Flexible Infrastructure



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Network Load Flow and Voltage Drop Simulation

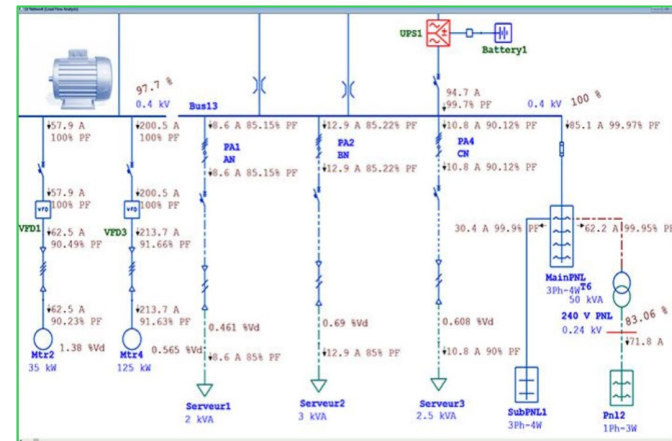
Perform power flow analysis and voltage drop calculations

Primary Department

- Project Procurement / Delivery
- Design Firms

Benefits

- Simulate bus voltages, branch power factors, currents, system losses, power generation versus loading.
- Use ETAP Electrical Digital Twin model with powerful calculation engines and user-friendly interface.
- Simulate using multiple loading and generation conditions.



Network Load Flow and Voltage Drop Simulation in ETAP

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Electrical Network Short Circuit Simulation

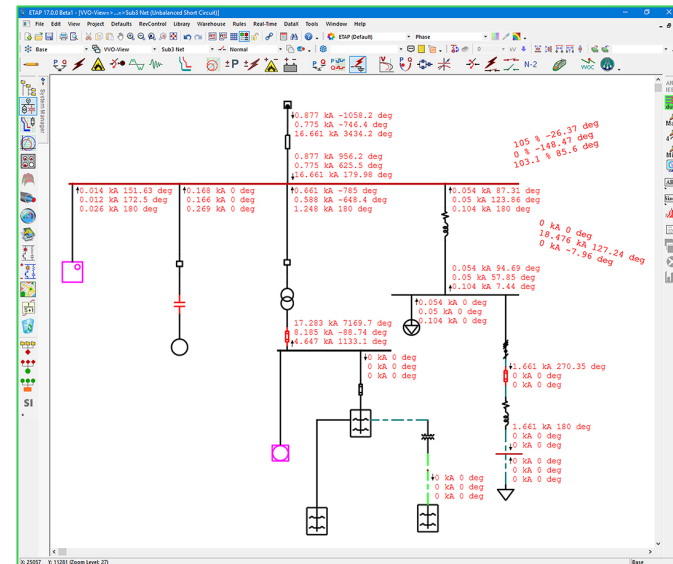
Design and simulate unbalanced short circuits

Primary Department

- Project Procurement / Delivery
- Design Firms

Benefits

- Expedite design studies with a wide range of calculation scenarios, including advanced fault analysis.
 - IEC & ANSI duty calculation for balanced and unbalanced faults
 - Simultaneous fault at selected nodes
 - Inclusive 3-Phase and 1-Phase fault analysis
 - Pre-fault system loading consideration



Electrical Network Short Circuit Simulation in ETAP

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Arc Fault Protection and Coordination

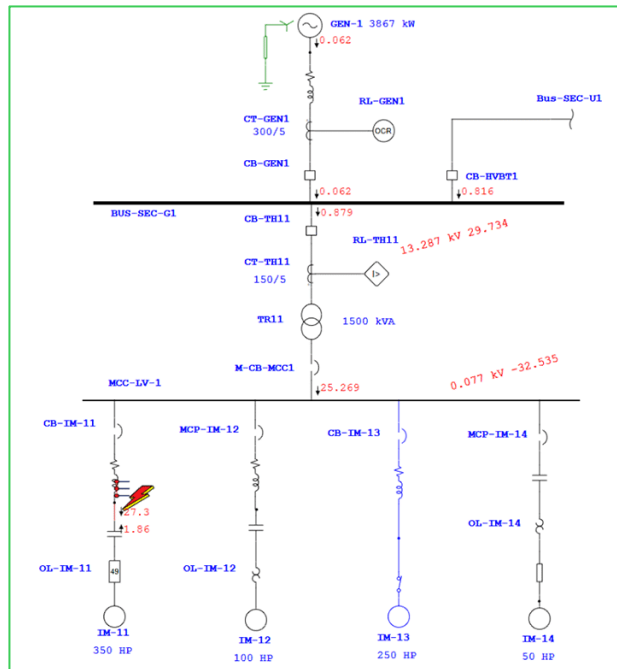
Perform sequence of operation for arc fault and bolted fault

Primary Department

- Project Procurement / Delivery
- Design Firms

Benefits

- Evaluate, verify, and confirm the operation and selectivity of the protective devices:
 - Various types of faults for any location
- Support displaying animation on the single-line diagram.
- Enable 3-phase / 1-phase sequence of operation.



Arc Fault Protection and Coordination in ETAP

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Capabilities to Operate Elec. Networks Efficient.

Capabilities to Decarbonize Airport Infrastruct.

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Device Coordination and Selectivity

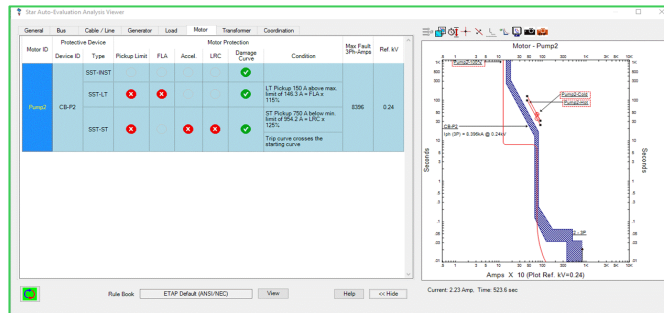
Automatically detect and evaluate the system protection and coordination/selectivity

Primary Department

- Project Procurement / Delivery
- Design Firms

Benefits

- Evaluate the system protection as well as the coordination/selectivity between circuit breakers.
 - Verified and validated libraries
 - Graphically adjustable device settings
 - Continuously synchronized with the one-line (single-line) diagram and integrated equipment database
- Provide detailed device settings reporting.



Device Coordination and Selectivity in ETAP

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Can Support the Airport IndustrySECTION 3 – Digital Solutions
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AC and DC Electrical Network Bus Design and Simulation

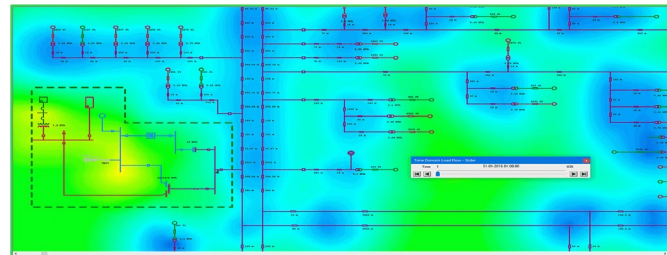
Optimize bus design allocation and simulation

Primary Department

- Project Procurement / Delivery
- Design Firms

Benefits

- Provide a single solution/environment.
 - Unified AC & DC solution from HV to LV
 - One unique platform and one database
- Enable efficient profile management.
 - User-defined loading and generation profiles
 - External data profile based on field measurements
- Enhance scalability.
 - Load growth study for future planning
- Facilitate event simulations within the calculation period.



ETAP Electrical Network Model

EcoStruxure™ Power for Airports (IEC)

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Power Quality Simulation and Modeling

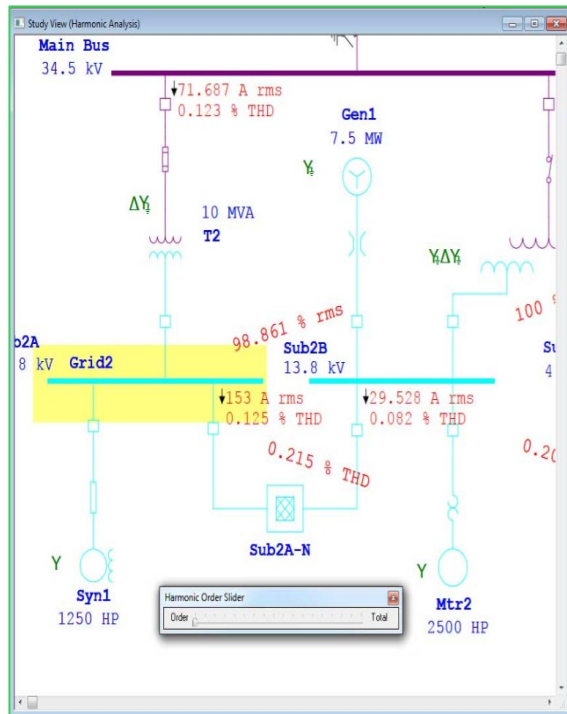
Evaluate and validate distortion due to harmonics

Primary Department

- Project Procurement / Delivery
- Design Firms

Benefits

- Simulate harmonic current and voltage sources:
 - To identify potential harmonic problems (report of harmonic voltage and current distortion limit violations);
 - To identify the need for a harmonics filter.
- Simulate and analyze the size of the harmonics filter the system will need, to optimize performance and reduce nuisance trips.



Power Quality Simulation and Modeling in ETAP

**EcoStruxure™ Power for Airports
(IEC)****SECTION 1 – Introduction to
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Transverse Lifecycle Capabilities

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Power System Study

Work with engineering experts to provide Power System Studies

Primary Department

- Project Procurement / Delivery
- Design Firms
- Facilities Electrical Department

Benefits

- Partner with a global team of experts, engaged with industry standards committees, to develop common safety standards and practices.
- Create a standardized approach to Power System Studies to support multisite deployments with consistent results.



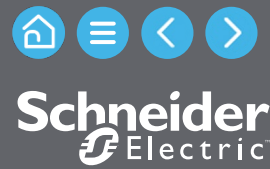
SECTION 1 – Introduction to
the Airport Industry

SECTION 2 – How EcoStruxure Power
Can Support the Airport Industry

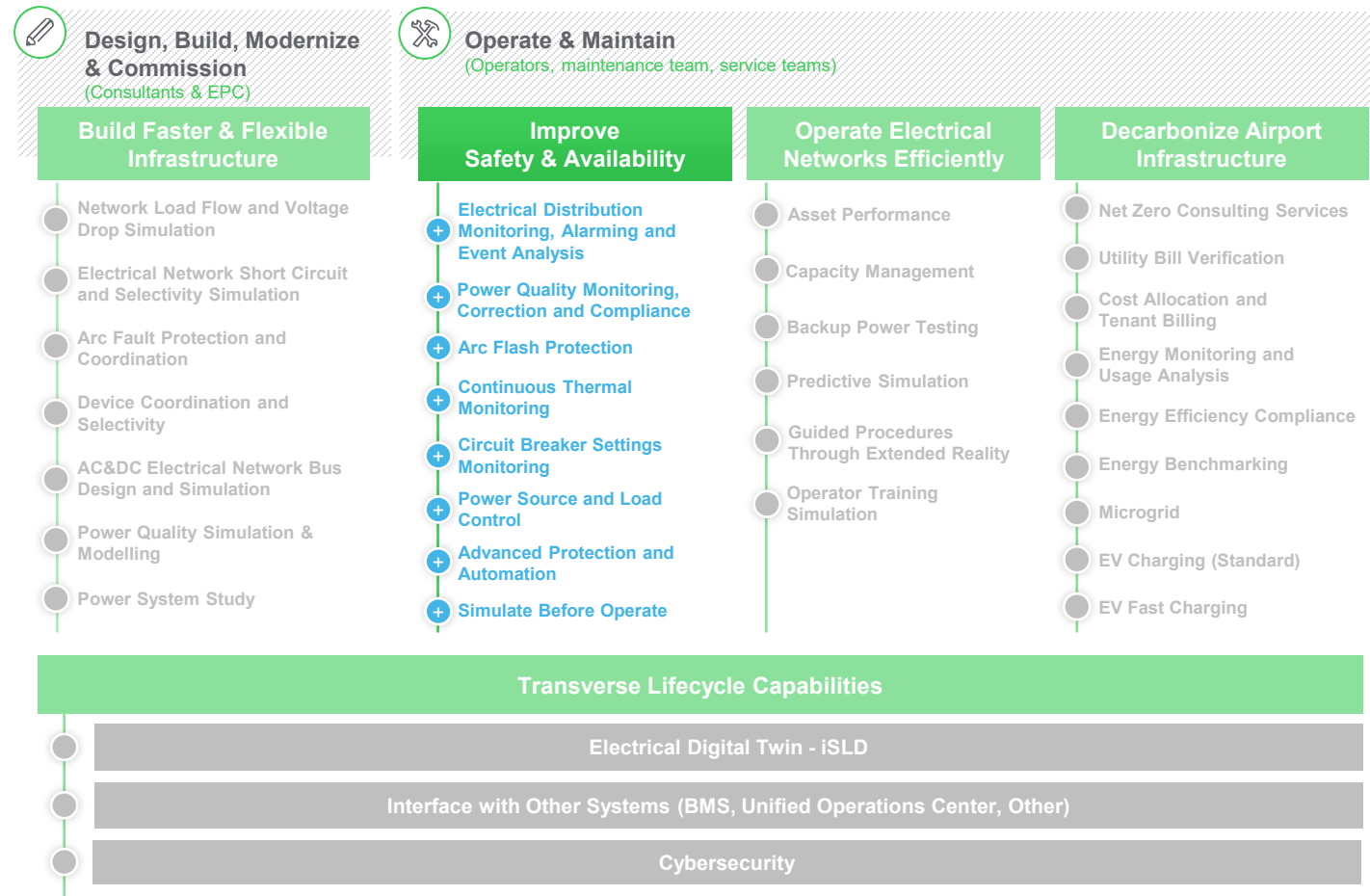
SECTION 3 – Digital Solutions
& Services

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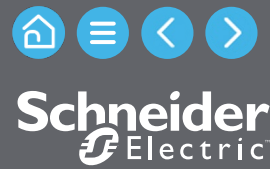


Capabilities to Improve Safety and Availability



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Electrical Distribution Monitoring, Alarming and Event Analysis



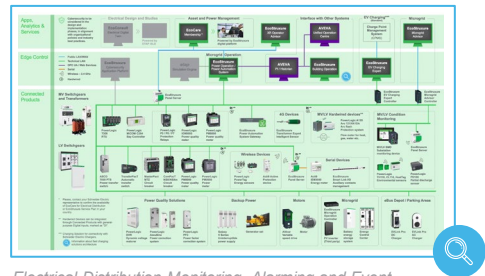
Monitor and control electrical network, Analyze the root causes of electrical events

Primary Department

- Facility Management / Utilities Management

Benefits

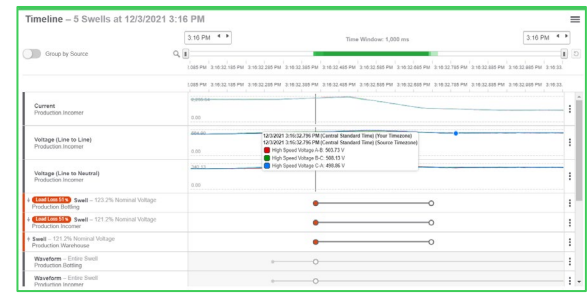
- Automatically classify and describe any electrical events.
- Show real-time status of the power distribution.
- Provide a customized single-line diagram.
- Offer 24/7 power monitoring and alarm notification.
- Use system intelligence to determine root cause and location of events.



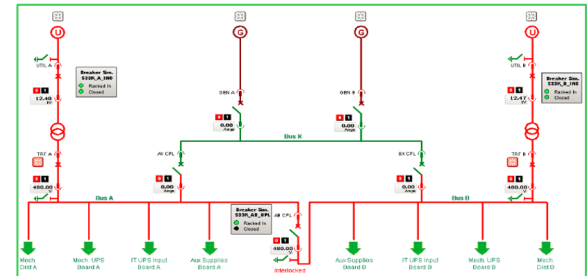
Electrical Distribution Monitoring, Alarming and Event Analysis Reference Architecture

Learn more about:

- Electrical distribution monitoring and alarming (IEC)
- Power Event Analysis (IEC)

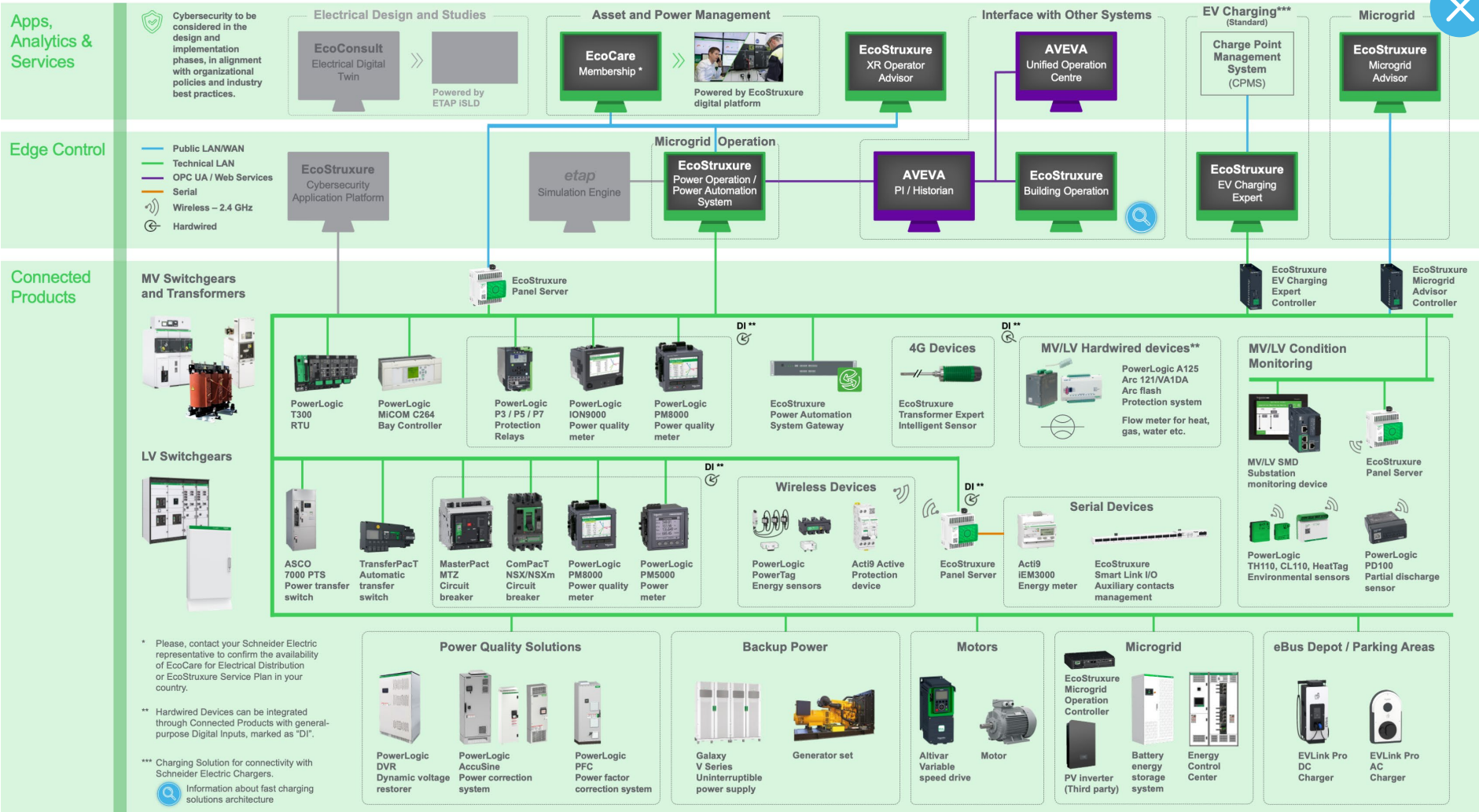


Event and Alarm Status Timeline in EcoStruxure Power Operation



Electrical Distribution Monitoring and Alarming Single-line Diagram in EcoStruxure Power Operation

Electrical Distribution Monitoring, Alarming and Event Analysis Reference Architecture



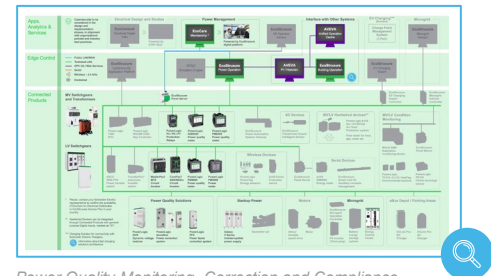
Help protect sensitive equipment from power quality issues

Primary Department

- Facility Management / Utilities Management

Benefits

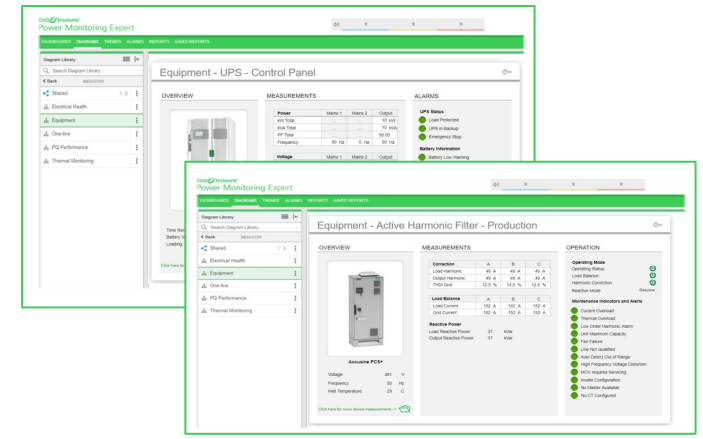
- Monitor sensitive process lines and busbars.
- Provide clean power to sensitive process equipment.
- Track Power Quality problems to help avoid downtime.
- Reduce financial impact of power factor on energy bill.



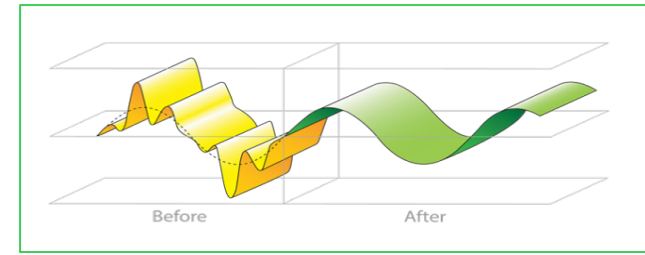
Power Quality Monitoring, Correction and Compliance
Reference Architecture

Learn more about:

- Power Quality Monitoring & Compliance ([IEC](#))
- Power Quality Correction ([IEC](#))
- Power Factor Correction ([IEC](#))

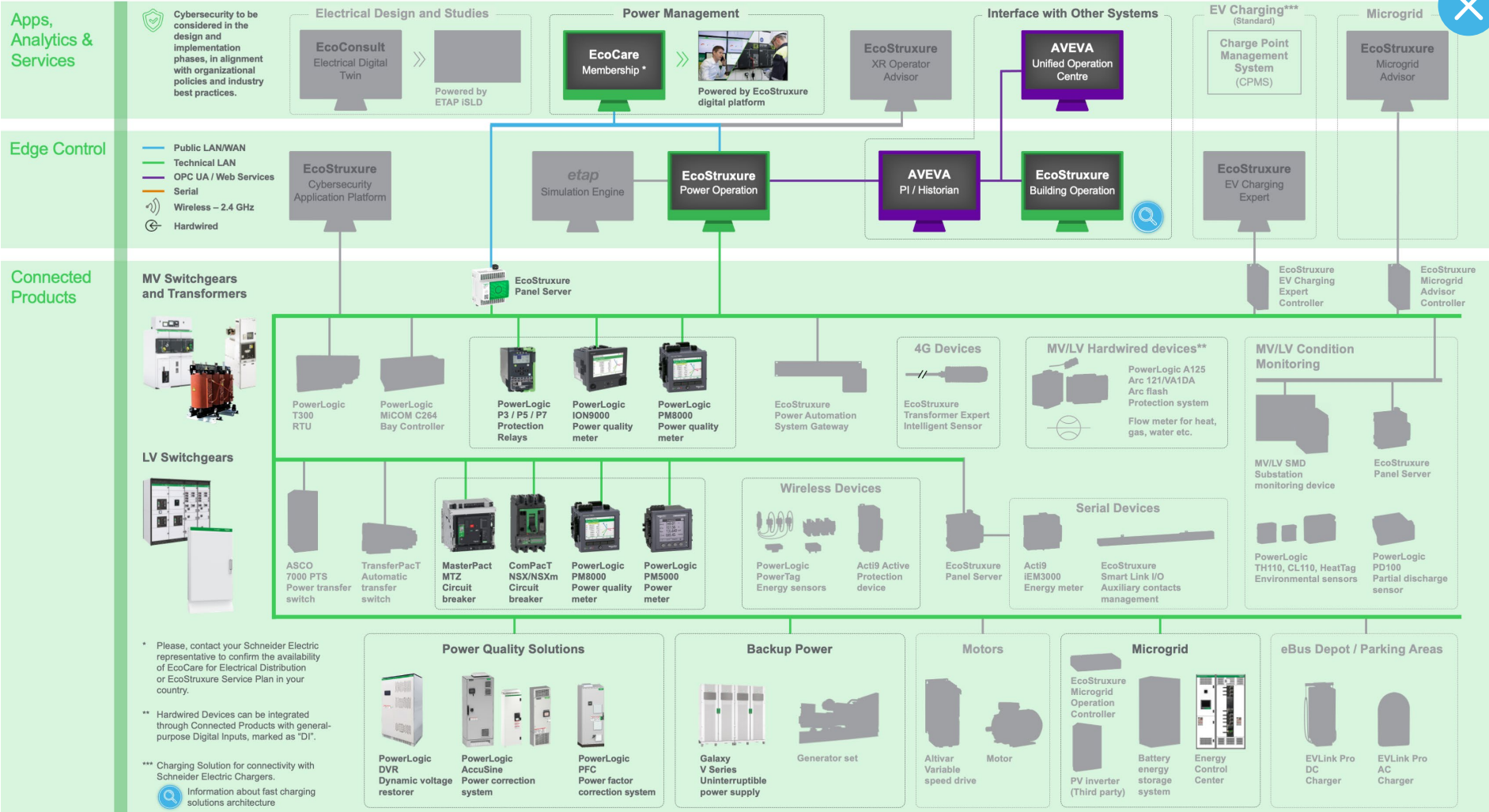


Power Quality Information in EcoStruxure Power Operation



Before and After Power Quality and Power Factor Correction Implementation

Power Quality Monitoring, Correction and Compliance Reference Architecture



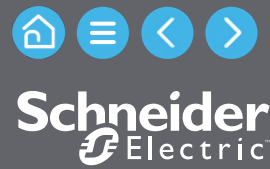
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Arc Flash Protection

Help protect employees and equipment

Primary Department

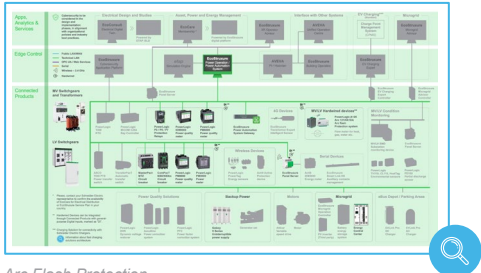
- Facility Management / Utilities Management

Benefits

- Help prevent loss of life and reduce the risk of equipment and electrical room damage.
- Improve maintenance team awareness to help troubleshoot and identify the root cause of arc flash events.



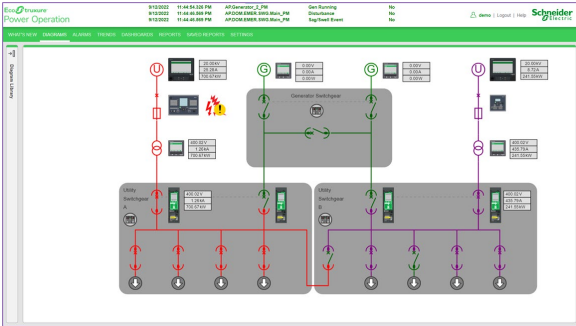
Arc Flash in a Switchboard



Arc Flash Protection
Reference Architecture

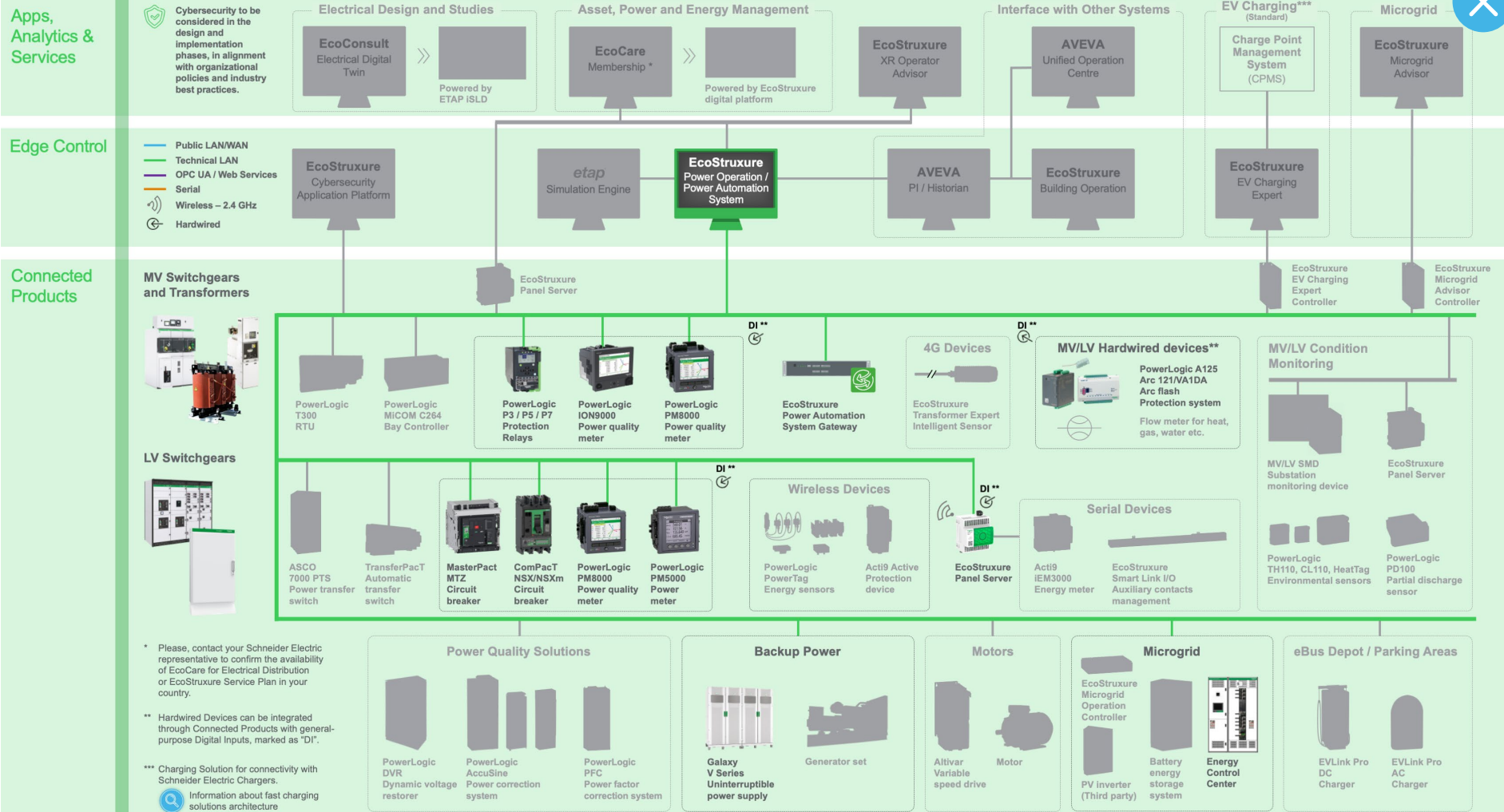
Learn more about:

- Arc Flash Protection ([IEC](#))



Arc Flash Alert and Location in EcoStruxure Power Operation

Arc Flash Protection Reference Architecture



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Continuous Thermal Monitoring

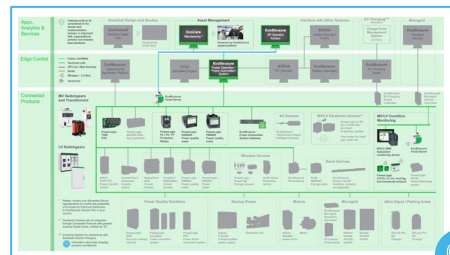
Help prevent electrical fires and help protect equipment

Primary Department

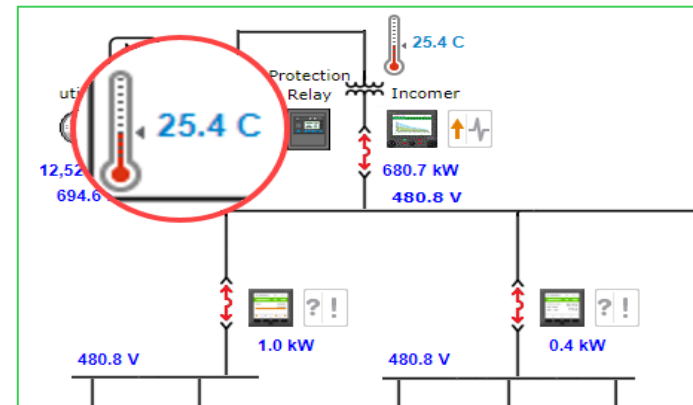
- Facility Management / Utilities Management

Benefits

- Bring early detection of temperature abnormalities.
- Help reduce the risk of equipment and electrical room damage and improve service continuity.
- Enable cost effective maintenance.



Continuous Thermal Monitoring
Reference Architecture



Continuous Thermal Monitoring in the Single-line Diagram of EcoStruxure Power Operation



Learn more about:

- Continuous Thermal monitoring ([IEC](#))

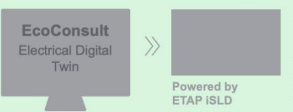
Continuous Thermal Monitoring Reference Architecture

Apps, Analytics & Services

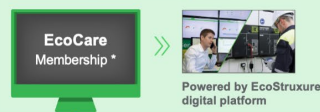


Cybersecurity to be considered in the design and implementation phases, in alignment with organizational policies and industry best practices.

Electrical Design and Studies



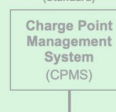
Asset Management



Interface with Other Systems



EV Charging*** (Standard)

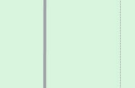
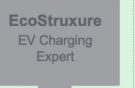
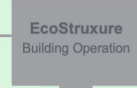
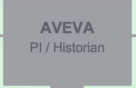
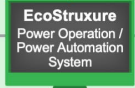
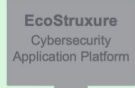


Microgrid



Edge Control

- Public LAN/WAN
- Technical LAN
- OPC UA / Web Services
- Serial
- Wireless – 2.4 GHz
- Hardwired

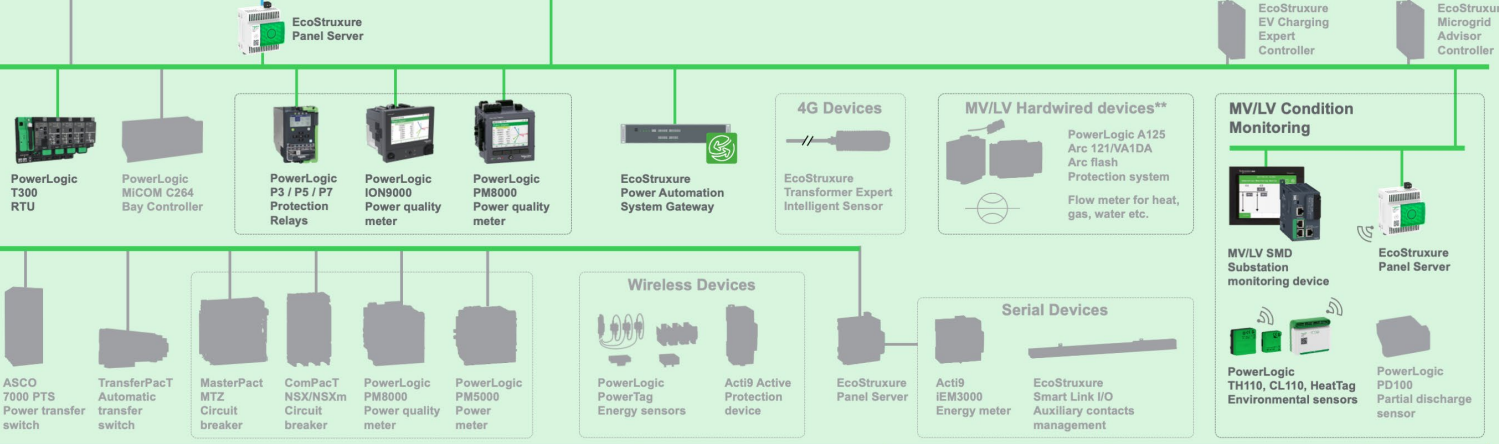
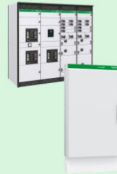


Connected Products

MV Switchgears and Transformers



LV Switchgears

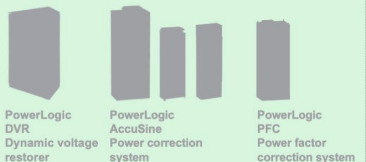


* Please, contact your Schneider Electric representative to confirm the availability of EcoCare for Electrical Distribution or EcoStruxure Service Plan in your country.

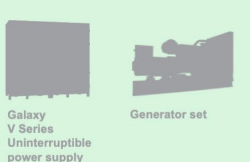
** Hardwired Devices can be integrated through Connected Products with general-purpose Digital Inputs, marked as "DI".

*** Charging Solution for connectivity with Schneider Electric Chargers.
Information about fast charging solutions architecture

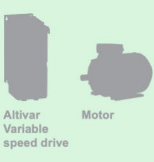
Power Quality Solutions



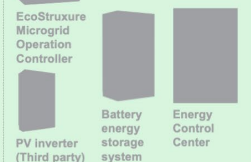
Backup Power



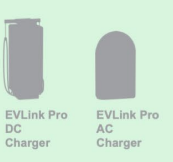
Motors



Microgrid



eBus Depot / Parking Areas



Circuit Breaker Settings Monitoring

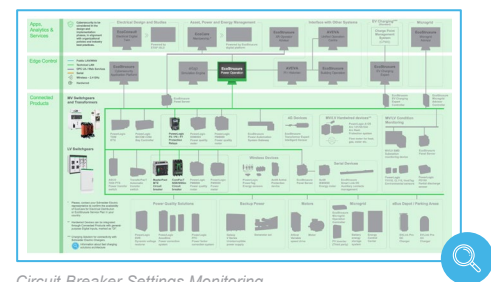
Avoid unplanned downtime due to electrical failure

Primary Department

- Facility Management / Utilities Management

Benefits

- Help ensure the integrity of protection settings throughout the entire lifecycle from design to operations.
- Compare current circuit breaker settings with commissioned settings.
- Help detect inappropriate setting modifications periodically
- Provide peace of mind due to complete breaker hierarchy oversight.



Circuit Breaker Settings Monitoring Reference Architecture

Learn more about:

- Circuit Breaker Settings Monitoring ([IEC](#))

Circuit Breaker Settings Report

Trip Settings - Main LV Switchboard

Main LV

Breaker Name	Protection Type	Active Protection Settings	Pickup (A)	Long Time Delay (S)	IZt	Pickup (A)	Short Time Delay (S)	IZt	Instantaneous Pickup (A)	Date of Data Reading
HC_Critical.MAIN_Bkr	5.0 (LSI)	Group A	1,600	0.50	I2T On	6,400	0.10	I2T Off	48,000	7/26/2018 10:59:32 AM
HC_Equipment.MAIN_Bkr	5.0 (LSI)	Group B	1,600	0.50	I2T On	9,600	0.20	I2T On	48,000	7/26/2018 10:54:32 AM
HC_Essential.MAIN_Bkr	5.0 (LSI)	Group A	3,150	0.50	I2T On	12,600	0.10	I2T Off	94,500	7/26/2018 10:34:32 AM
HC_Life_Safety.MAIN_Bkr	5.0 (LSI)	Group A	800	0.50	I2T On	3,200	0.10	I2T Off	24,000	7/26/2018 10:34:32 AM
HC_Non_Essential.MAIN_Bkr	5.0 (LSI)	Group A	1,600	0.50	I2T On	6,400	0.10	I2T Off	48,000	7/26/2018 11:24:32 AM

Breaker Name	Pickup (A)	Ground Fault Delay (S)	IZt	Pickup (A)	Earth Leakage Delay (S)	Date of Data Reading
HC_Critical.MAIN_Bkr	N/A	N/A	N/A	N/A	N/A	7/26/2018 10:59:32 AM
HC_Equipment.MAIN_Bkr	N/A	N/A	N/A	N/A	N/A	7/26/2018 10:54:32 AM
HC_Essential.MAIN_Bkr	N/A	N/A	N/A	N/A	N/A	7/26/2018 10:34:32 AM
HC_Life_Safety.MAIN_Bkr	N/A	N/A	N/A	N/A	N/A	7/26/2018 10:34:32 AM
HC_Non_Essential.MAIN_Bkr	N/A	N/A	N/A	N/A	N/A	7/26/2018 11:24:32 AM

Configuration Settings of the Circuit Breakers - Highlights Changes Between the Baseline and the Last Known Values in EcoStruxure Power Operation

Circuit Breaker Settings Monitoring Reference Architecture

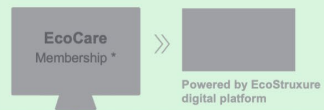
Apps, Analytics & Services

 Cybersecurity to be considered in the design and implementation phases, in alignment with organizational policies and industry best practices.

Electrical Design and Studies



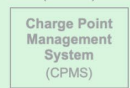
Asset, Power and Energy Management



Interface with Other Systems



EV Charging*** (Standard)

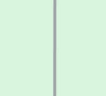
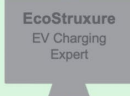
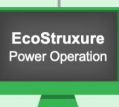
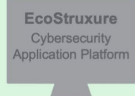


Microgrid



Edge Control

- Public LAN/WAN
- Technical LAN
- OPC UA / Web Services
- Serial
- Wireless – 2.4 GHz
- Hardwired

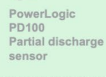
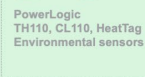
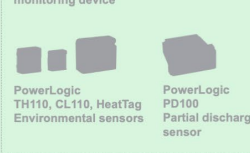
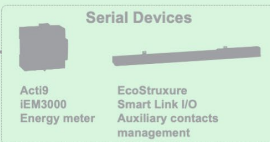
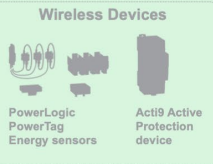


Connected Products

MV Switchgears and Transformers



LV Switchgears



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*** Charging Solution for connectivity with Schneider Electric Chargers.
 Information about fast charging solutions architecture

Power Quality Solutions



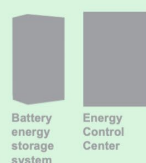
Backup Power



Motors



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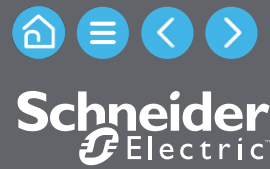


eBus Depot / Parking Areas



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Power Source & Load Control



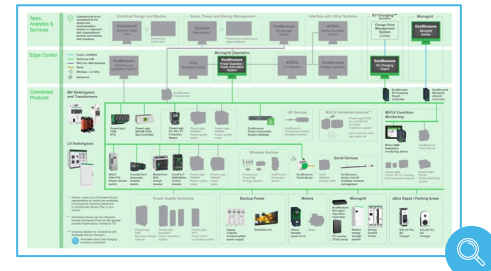
Maximize availability through smart control & load management

Primary Department

- Facility Management / Utilities Management

Benefits

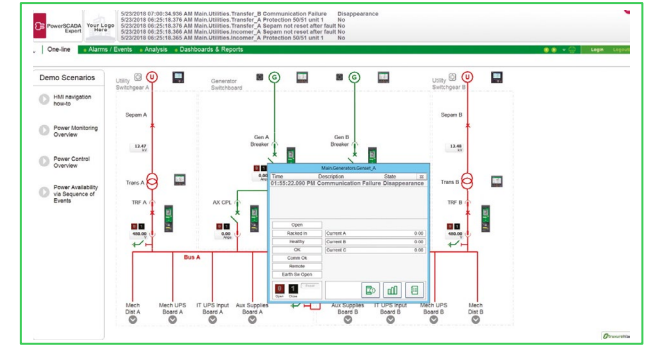
- Remotely control, visualize, and supervise automatic transfer schemes.
- Help preserve critical loads by automatically transferring to alternate power.
- Get real-time visibility, automation and control of the entire electrical infrastructure.
- Visualize and audit sequences of operations.



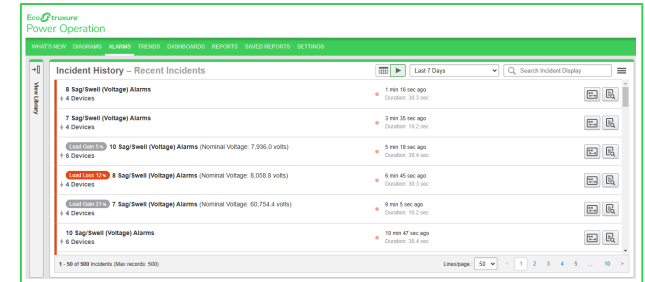
Power Source & Load Control
Reference Architecture

Learn more about:

• Power Source & Load Control ([IEC](#))

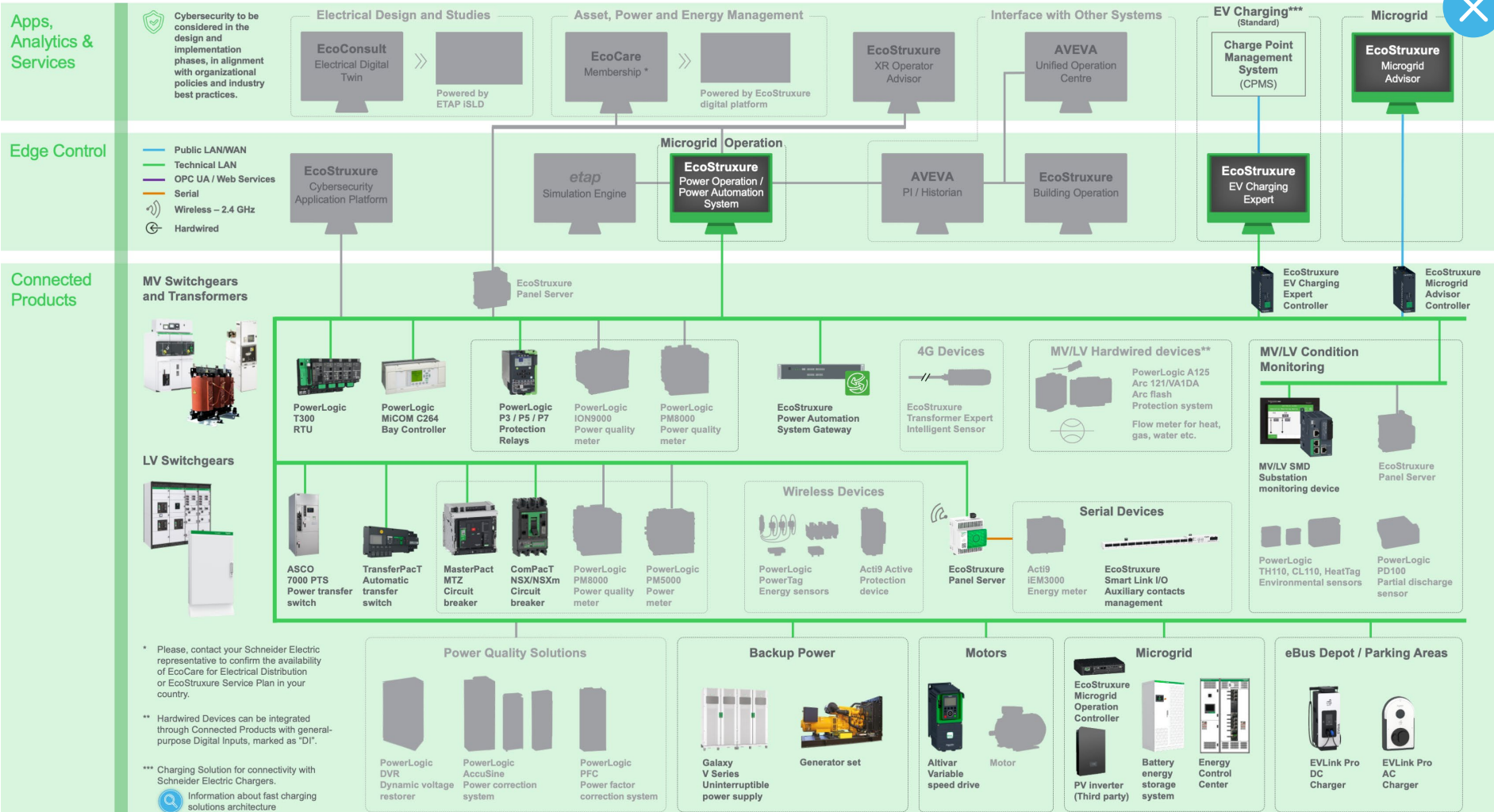


Animated Single-Line Diagram with Live Status of the Entire Electrical Distribution Network in EcoStruxure Power Operation



High Speed and High Precision Sequence of Events in EcoStruxure Power Operation

Power Source & Load Control Reference Architecture



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Capabilities to Operate Elec. Networks Efficient.

Capabilities to Decarbonize Airport Infrastruct.

Transverse Lifecycle Capabilities

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Advanced Protection and Automation

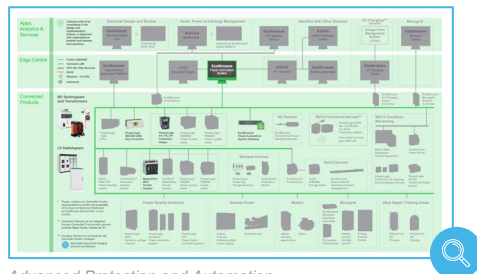
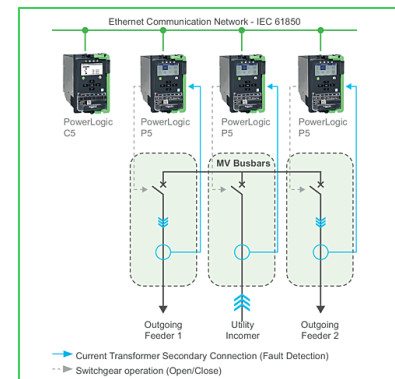
Operate reliable electrical network using protection and fault tolerant automation schemes

Primary Department

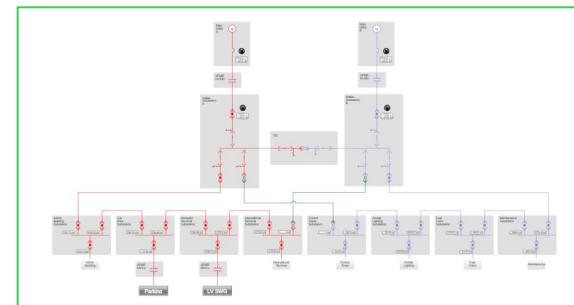
- Facility Management / Utilities Management

Benefits

- Help protect electrical networks from faults like short-circuit, overload, etc.
- Support continuity of service in case of outages with an autonomous and fast response to events (fast self-healing, automatic transfer switch, load-shedding, etc.).
- Assist in restoring power quickly, using electrical diagnostic information and remote control of breakers.

Advanced Protection and Automation
Reference Architecture

Protection and Automation in MV Incomer Substation

Animated Single-Line Diagram with Live Power Network Visualization in
EcoStruxure Power Operation

Learn more about:

- Advanced Protection and Automation ([IEC](#))



Advanced Protection and Automation Reference Architecture

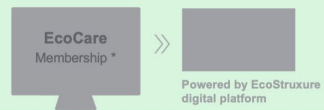
Apps, Analytics & Services

Cybersecurity to be considered in the design and implementation phases, in alignment with organizational policies and industry best practices.

Electrical Design and Studies



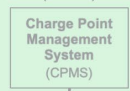
Asset, Power and Energy Management



Interface with Other Systems



EV Charging*** (Standard)

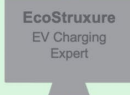
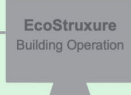
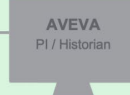
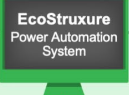
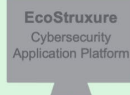


Microgrid



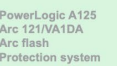
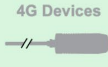
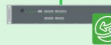
Edge Control

- Public LAN/WAN
- Technical LAN
- OPC UA / Web Services
- Serial
- Wireless – 2.4 GHz
- Hardwired

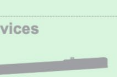


Connected Products

MV Switchgears and Transformers



LV Switchgears



* Please, contact your Schneider Electric representative to confirm the availability of EcoCare for Electrical Distribution or EcoStruxure Service Plan in your country.

** Hardwired Devices can be integrated through Connected Products with general-purpose Digital Inputs, marked as "DI".

*** Charging Solution for connectivity with Schneider Electric Chargers.
Information about fast charging solutions architecture

Power Quality Solutions



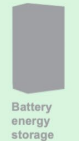
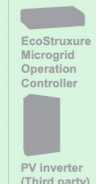
Backup Power



Motors



Microgrid



eBus Depot / Parking Areas



SECTION 1 – Introduction to
the Airport IndustrySECTION 2 – How EcoStruxure Power
Can Support the Airport IndustrySECTION 3 – Digital Solutions
& Services

Introduction

Overview of Digital Solutions & Services

Capabilities to Build Faster Flexible Infrastruct.

Capabilities to Improve Safety & Availability ▶

Capabilities to Operate Elec. Networks Efficient.

Capabilities to Decarbonize Airport Infrastruct.

Transverse Lifecycle Capabilities

BIBLIOGRAPHY



Simulate Before Operate

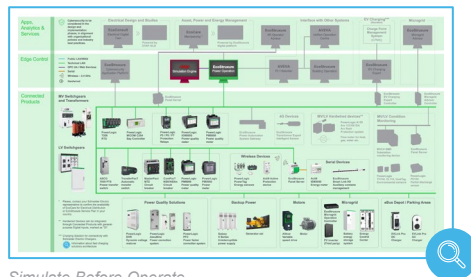
Empower operators with predictive outcomes

Primary Department

- Facility Management / Utilities Management

Benefits

- Provide operators with a list of potential side effects, prior to executing a command.
- Empower employees to feel more confident when operating their facilities by providing real time guidance.
- Reduce human error that could lead to outages or safety concerns.

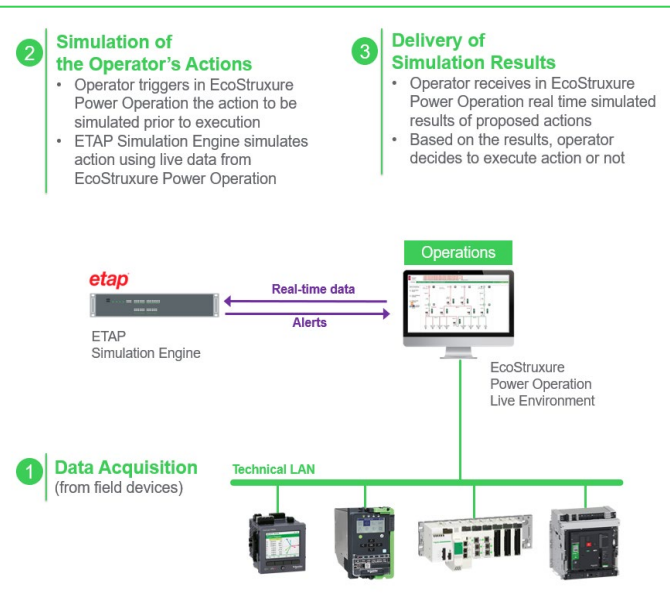


Simulate Before Operate
Reference Architecture



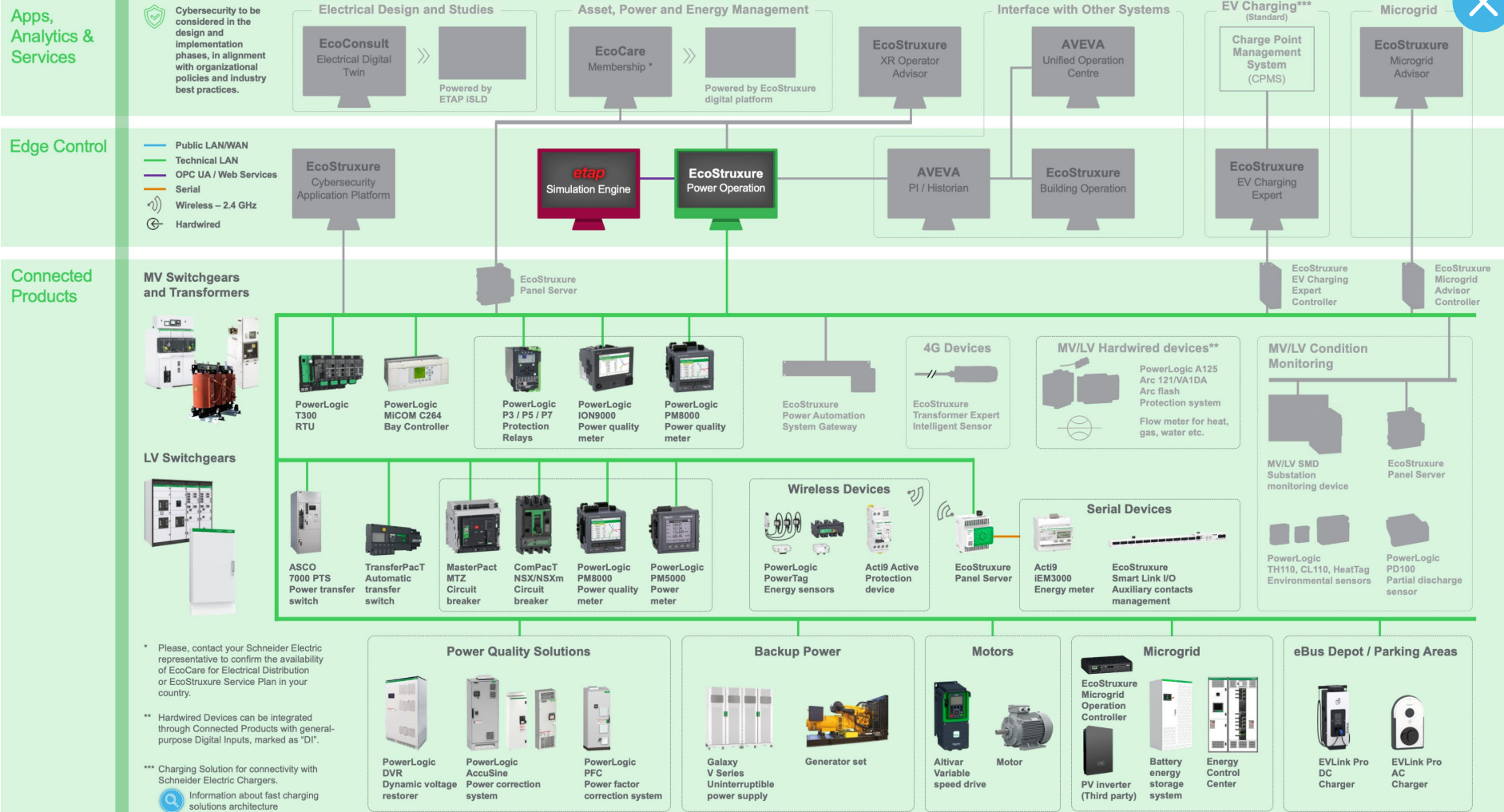
Learn more about:

- Simulate Before Operate ([IEC](#))

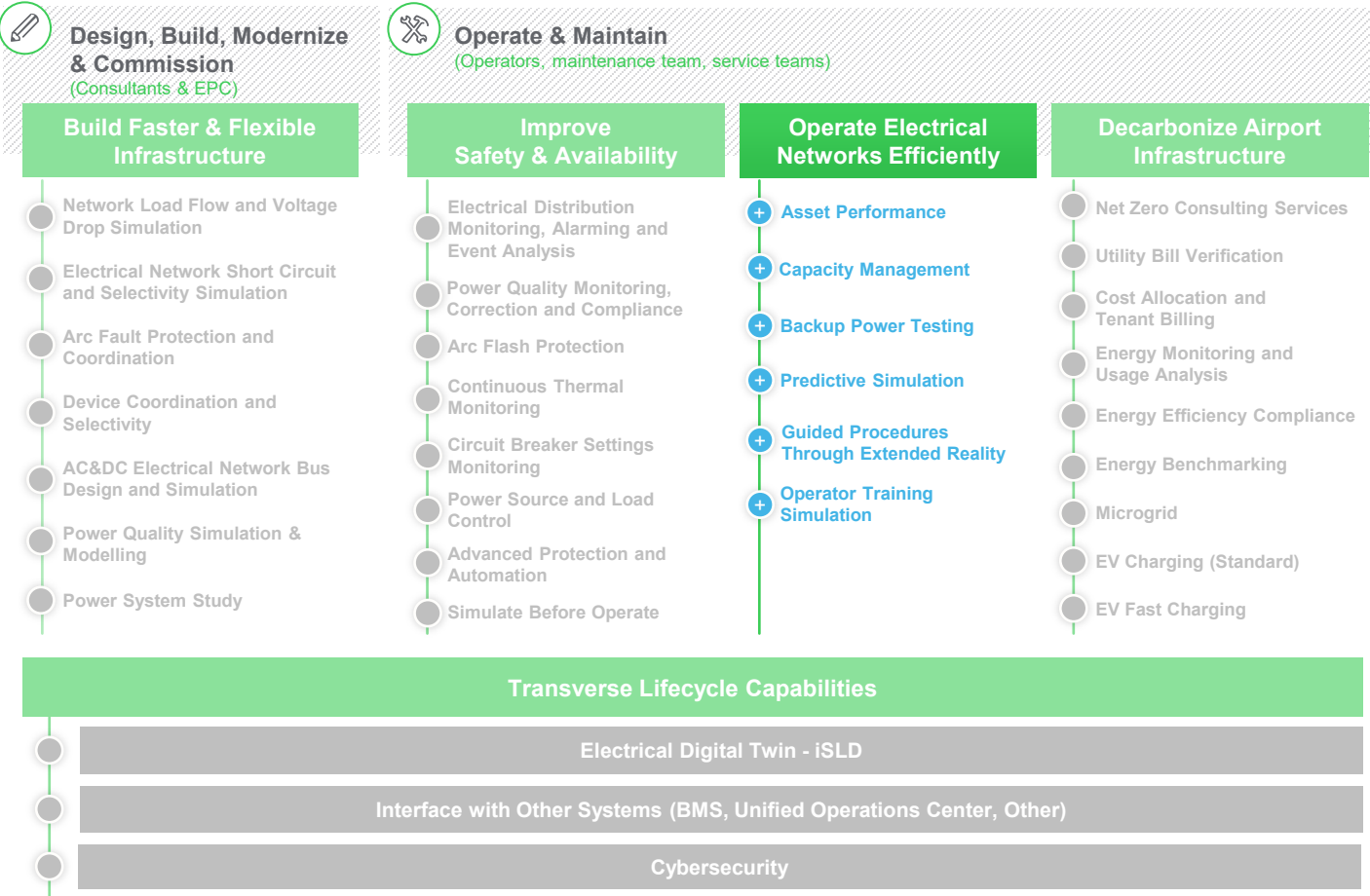


Principle of Simulate before Operate Application

Simulate Before Operate Reference Architecture

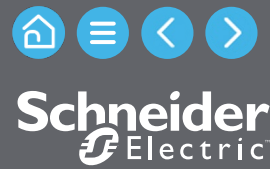


Capabilities to Operate Electrical Networks Efficiently



- Introduction
- Overview of Digital Solutions & Services
- Capabilities to Build Faster Flexible Infrastruct.
- Capabilities to Improve Safety & Availability
- Capabilities to Operate Elec. Networks Efficient. ▶
- Capabilities to Decarbonize Airport Infrastruct.
- Transverse Lifecycle Capabilities

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Asset Performance



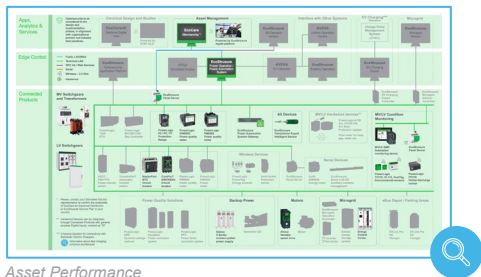
Benefit from a strategic maintenance approach

Primary Department

- Facility Management / Utilities Management

Benefits

- Move from reactive or preventive to condition-based (predictive) maintenance strategies for critical assets like circuit breakers, gensets, transformers, etc.
- Provide event details and notification to the operator if a protection setting has been changed.
- Receive notifications and diagnostics reports from expert service engineers with recommendations to optimize maintenance by asset.

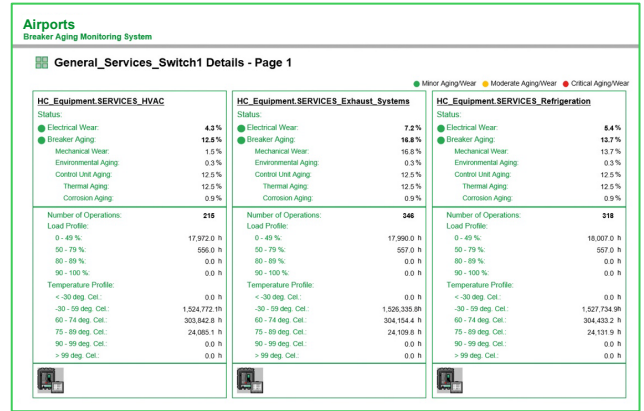


Asset Performance Reference Architecture

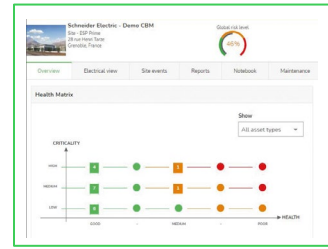


Learn more about:

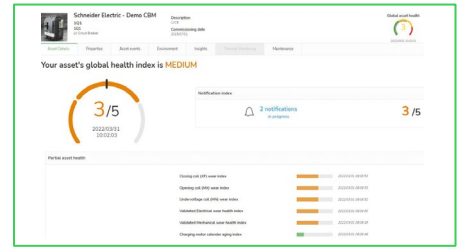
- Asset Performance ([IEC](#))



Aging Diagram for Circuit Breakers in EcoStruxure Power Operation

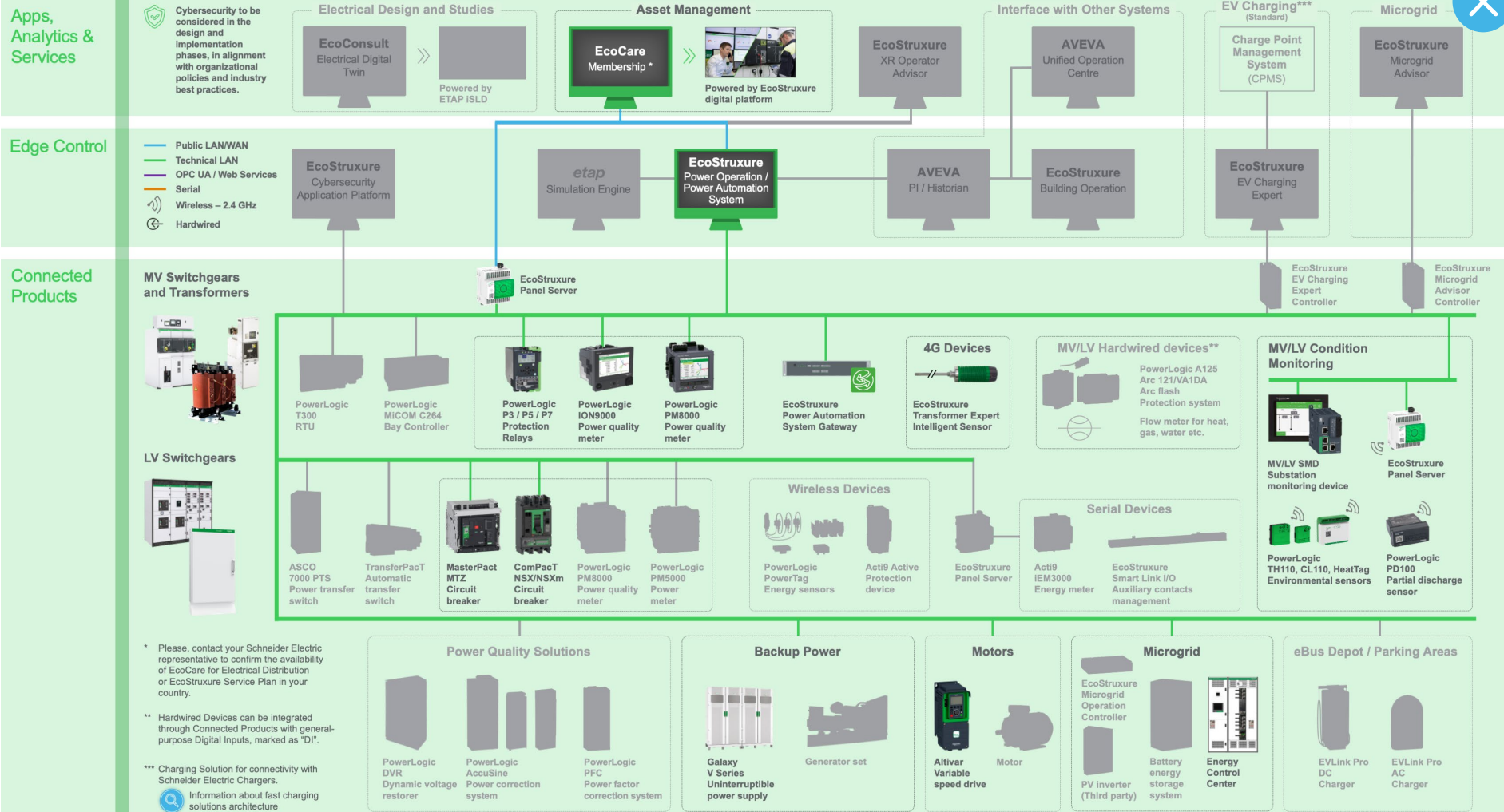


EcoStruxure Asset Advisor Risk Level Dashboard



EcoStruxure Asset Advisor Asset Health Dashboard

Asset Performance Reference Architecture



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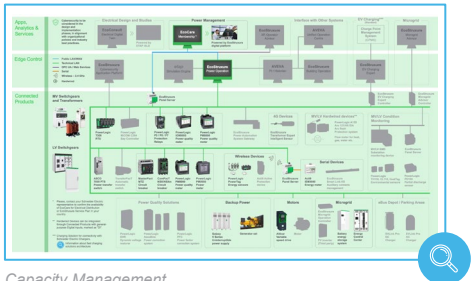
Monitor the capacity of electrical distribution

Primary Department

- Facility Management / Utilities Management

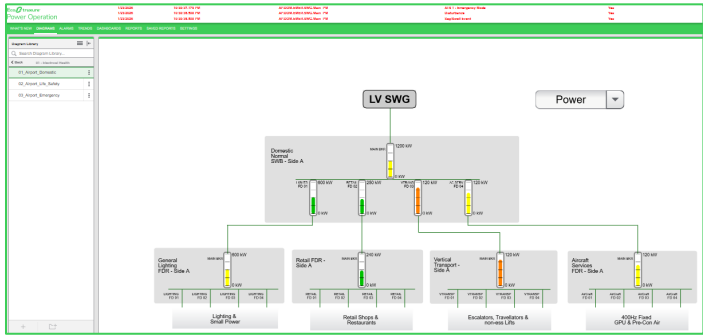
Benefits

- Monitor electrical network capacity.
- Track and review capacity efficiency.
- Minimize downtime by tracking the capacity of transformers, circuit breakers, UPSs, generators, etc.



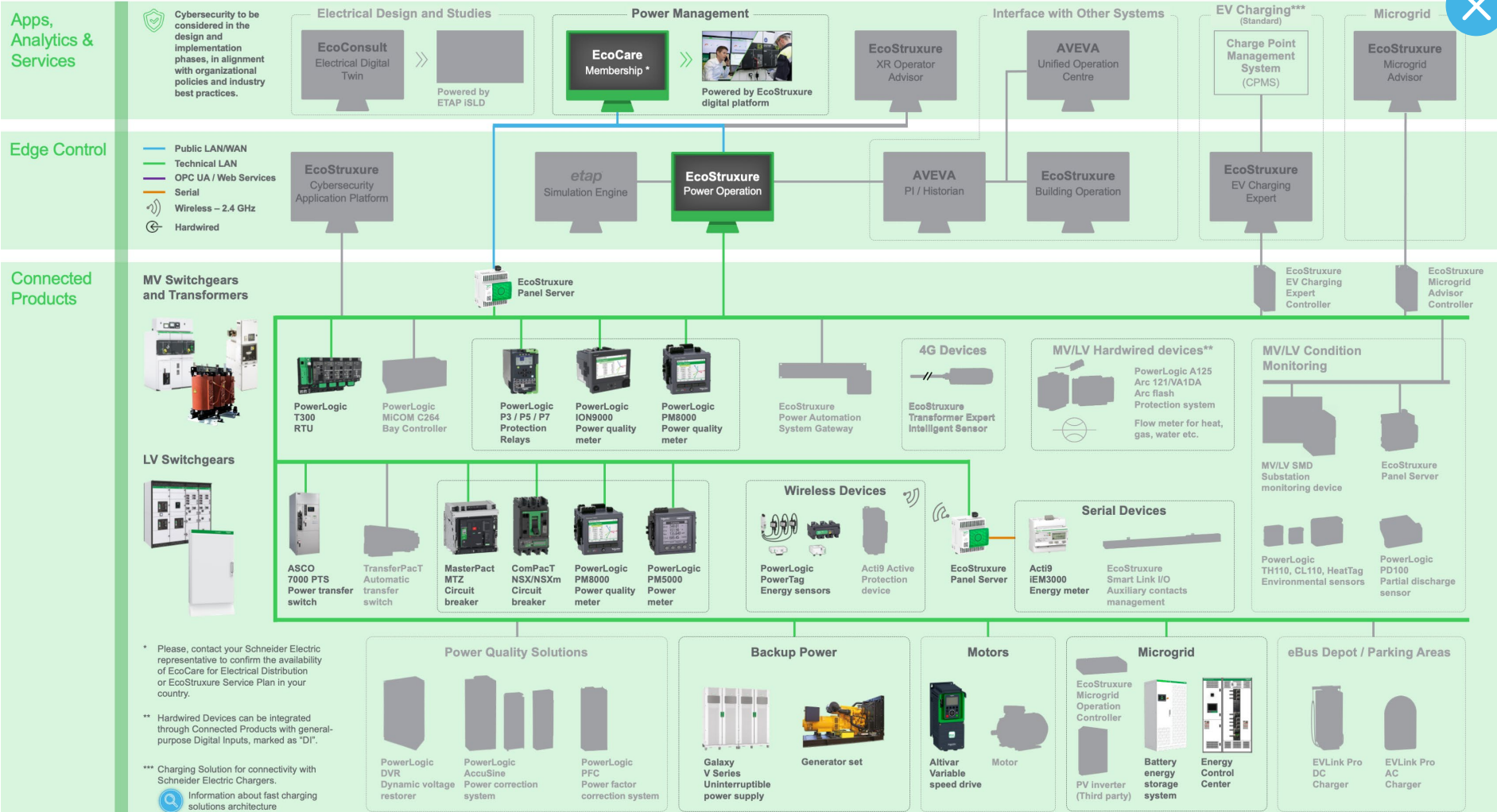
Capacity Management Reference Architecture

Learn more about:
• Capacity Management ([IEC](#))



Feeder-Wise Power Capacity Display for Capacity Management in EcoStruxure Power Operation

Capacity Management Reference Architecture





Backup Power Testing



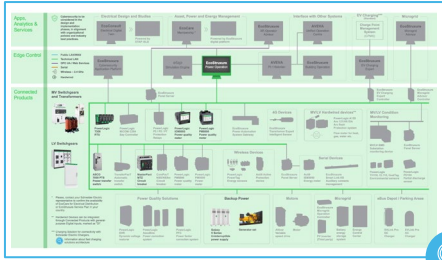
Enhance reliable backup power for critical airport operations

Primary Department

- Facility Management / Utilities Management

Benefits

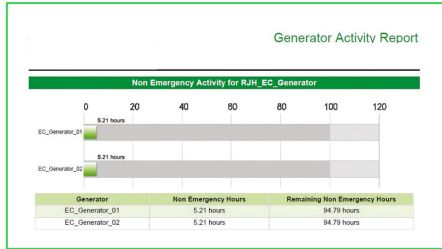
- Record key test parameters related to generator reliability like run time, exhaust temperature etc..
- Capture generator battery and UPS electrical signature helping to identify degradation over time.
- Mitigate human error and save time by automating testing and reporting.



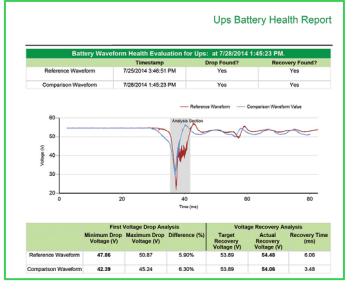
Backup Power Testing Reference Architecture

**Learn more about:**

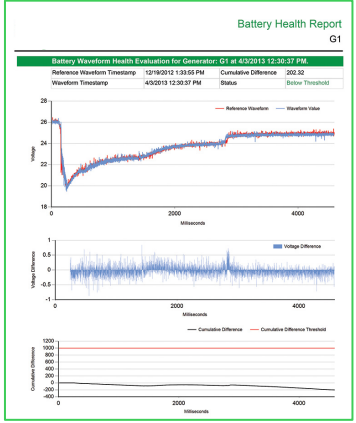
- Backup Power Testing ([IEC](#))



Generator Activity Report in EcoStruxure Power Operation

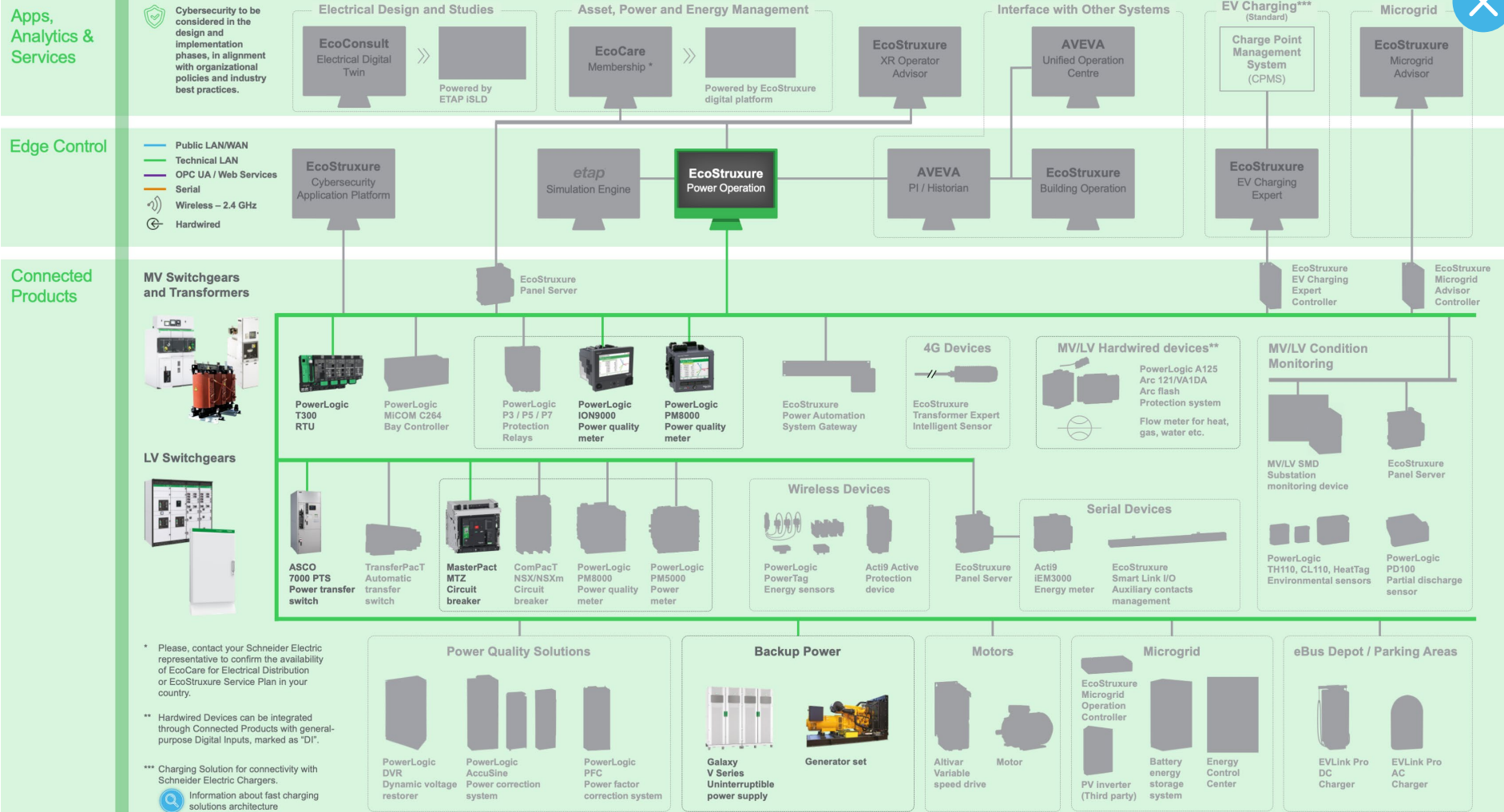


UPS Battery Health Report in EcoStruxure Power Operation



Generator Battery Health Report in EcoStruxure Power Operation

Backup Power Testing Reference Architecture



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Predictive Simulation

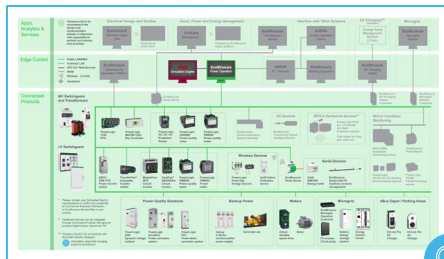
Help employees make better decisions

Primary Department

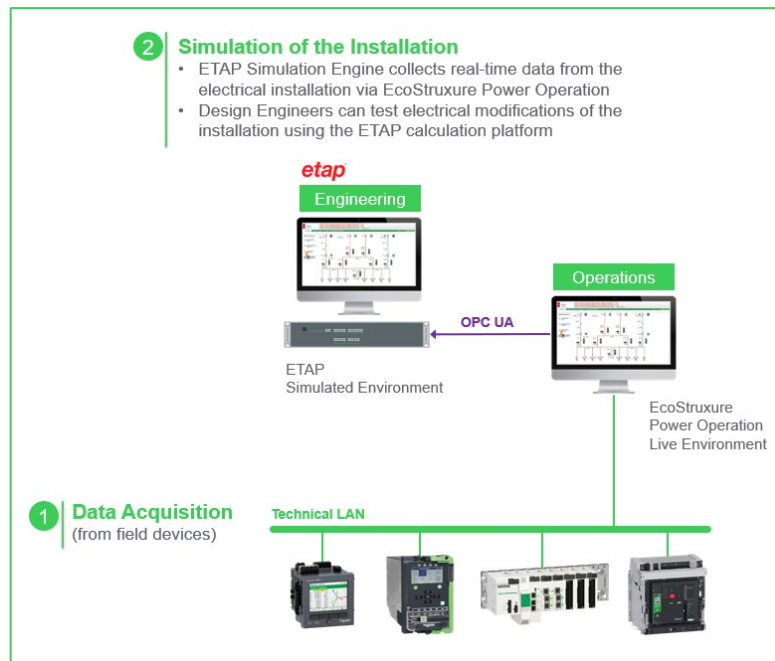
- Facility Management / Utilities Management

Benefits

- Reduce safety risks by practicing emergencies and high-risk situations
- Enhance operational efficiency by running “what-if” scenarios
- Provide faster analysis response to incidents



Predictive Simulation
Reference Architecture



Principle of Predictive Simulation Application

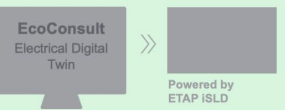
Predictive Simulation Reference Architecture

Apps, Analytics & Services

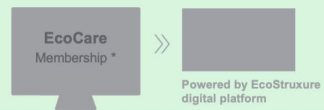


Cybersecurity to be considered in the design and implementation phases, in alignment with organizational policies and industry best practices.

Electrical Design and Studies



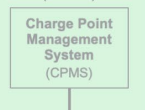
Asset, Power and Energy Management



Interface with Other Systems



EV Charging*** (Standard)

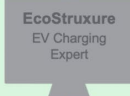
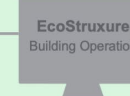
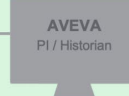
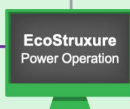
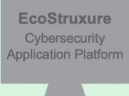


Microgrid



Edge Control

- Public LAN/WAN
- Technical LAN
- OPC UA / Web Services
- Serial
- Wireless – 2.4 GHz
- Hardwired

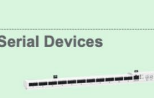


Connected Products

MV Switchgears and Transformers



LV Switchgears



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** Hardwired Devices can be integrated through Connected Products with general-purpose Digital Inputs, marked as "DI".

*** Charging Solution for connectivity with Schneider Electric Chargers.
Information about fast charging solutions architecture

Power Quality Solutions



Backup Power



Motors



Microgrid



eBus Depot / Parking Areas



Reduce the risk of human error when working on electrical equipment

Primary Department

- Facility Management / Utilities Management

Benefits

Overview of Digital Solutions & Services

- Help analyze the status and data of equipment.
- Provide guidance to perform complicated or unfamiliar procedure.
- Enable remote collaboration with experts in other locations.
- Leverage “X-ray” vision and virtually overlay contextual asset and site information, live data, events and alarms.

Capabilities to Build Faster Flexible Infrastruct.

Capabilities to Improve Safety & Availability

Capabilities to Operate Elec. Networks Efficient. ►

Capabilities to Decarbonize Airport Infrastruct.

Transverse Lifecycle Capabilities

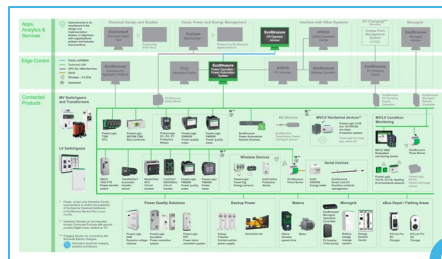
BIBLIOGRAPHY



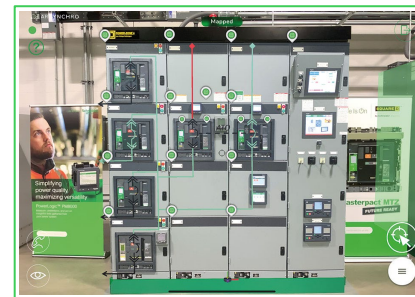
Overlaid Live Data



"X-Ray" Vision

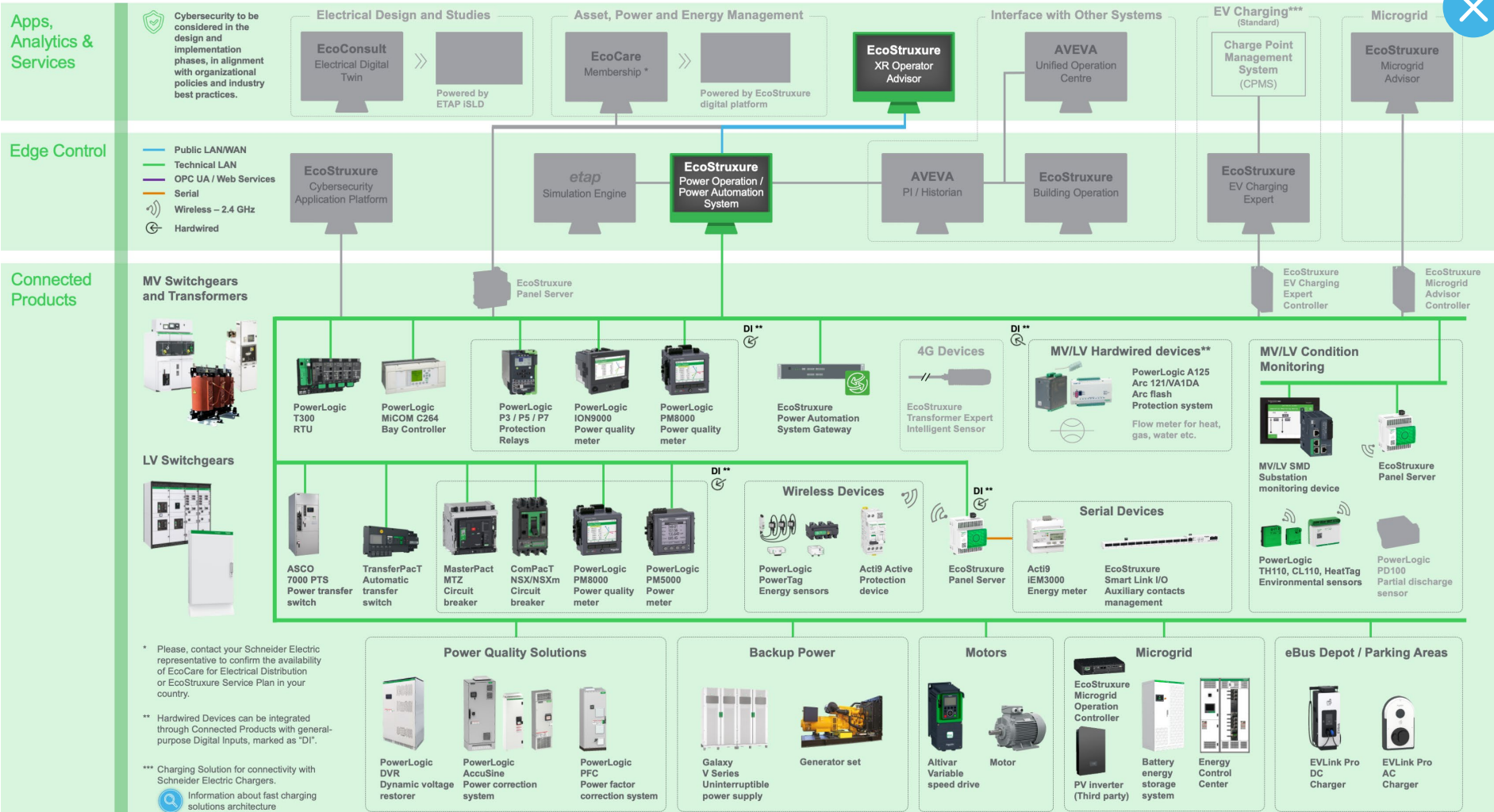


Guided Procedures Through Extended Reality Reference Architecture



Contextual Asset or Site Information overlaid on top of equipment

Guided Procedures Through Extended Reality Reference Architecture



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Can Support the Airport IndustrySECTION 3 – Digital Solutions
& Services

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Operator Training Simulation

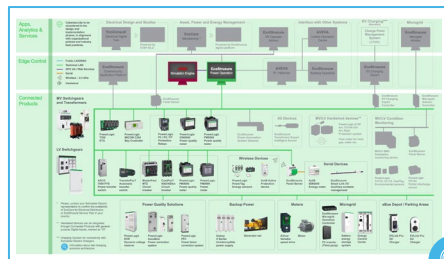
Train new employees and build confidence on new systems

Primary Department

- Facility Management / Utilities Management

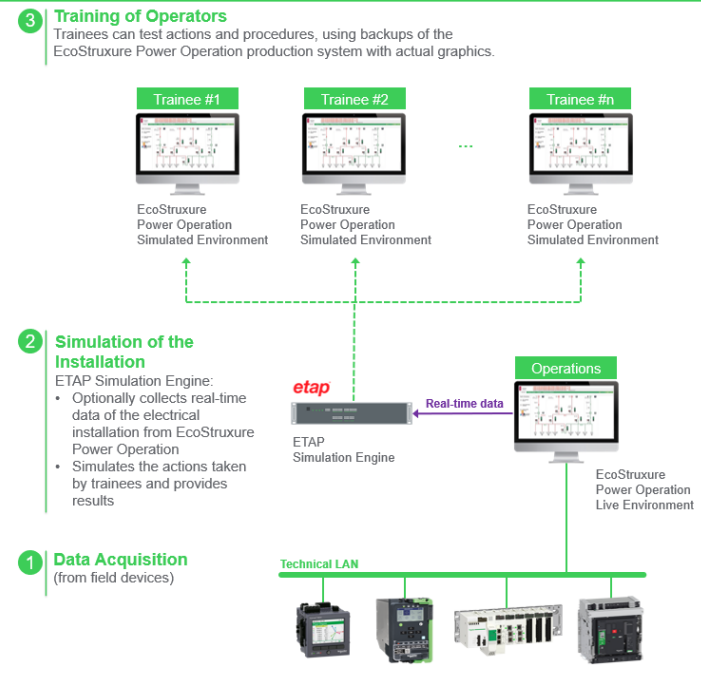
Benefits

- Practice operation within a simulated but highly realistic environment to enhance safety and operational efficiency.
- Track and review trainee actions to analyze and challenge them.

Operator Training Simulation
Reference Architecture

Learn more about:

- Operator Training Simulation ([IEC](#))



Principle of Operator Training Simulation Application

Operator Training Simulation Reference Architecture

Apps, Analytics & Services



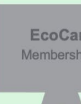
Cybersecurity to be considered in the design and implementation phases, in alignment with organizational policies and industry best practices.

Electrical Design and Studies



Powered by ETAP ISLD

Asset, Power and Energy Management



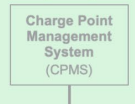
Powered by EcoStruxure digital platform



Interface with Other Systems



EV Charging*** (Standard)

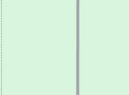
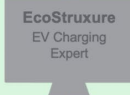
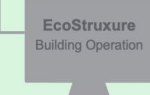
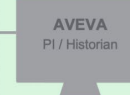
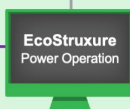
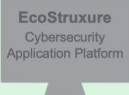


Microgrid



Edge Control

- Public LAN/WAN
- Technical LAN
- OPC UA / Web Services
- Serial
- Wireless – 2.4 GHz
- Hardwired



Connected Products

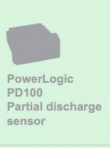
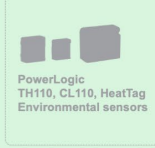
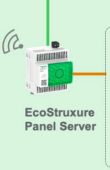
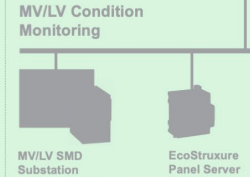
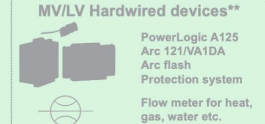
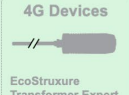
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LV Switchgears



EcoStruxure Panel Server



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Motors



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eBus Depot / Parking Areas



SECTION 1 – Introduction to
the Airport Industry

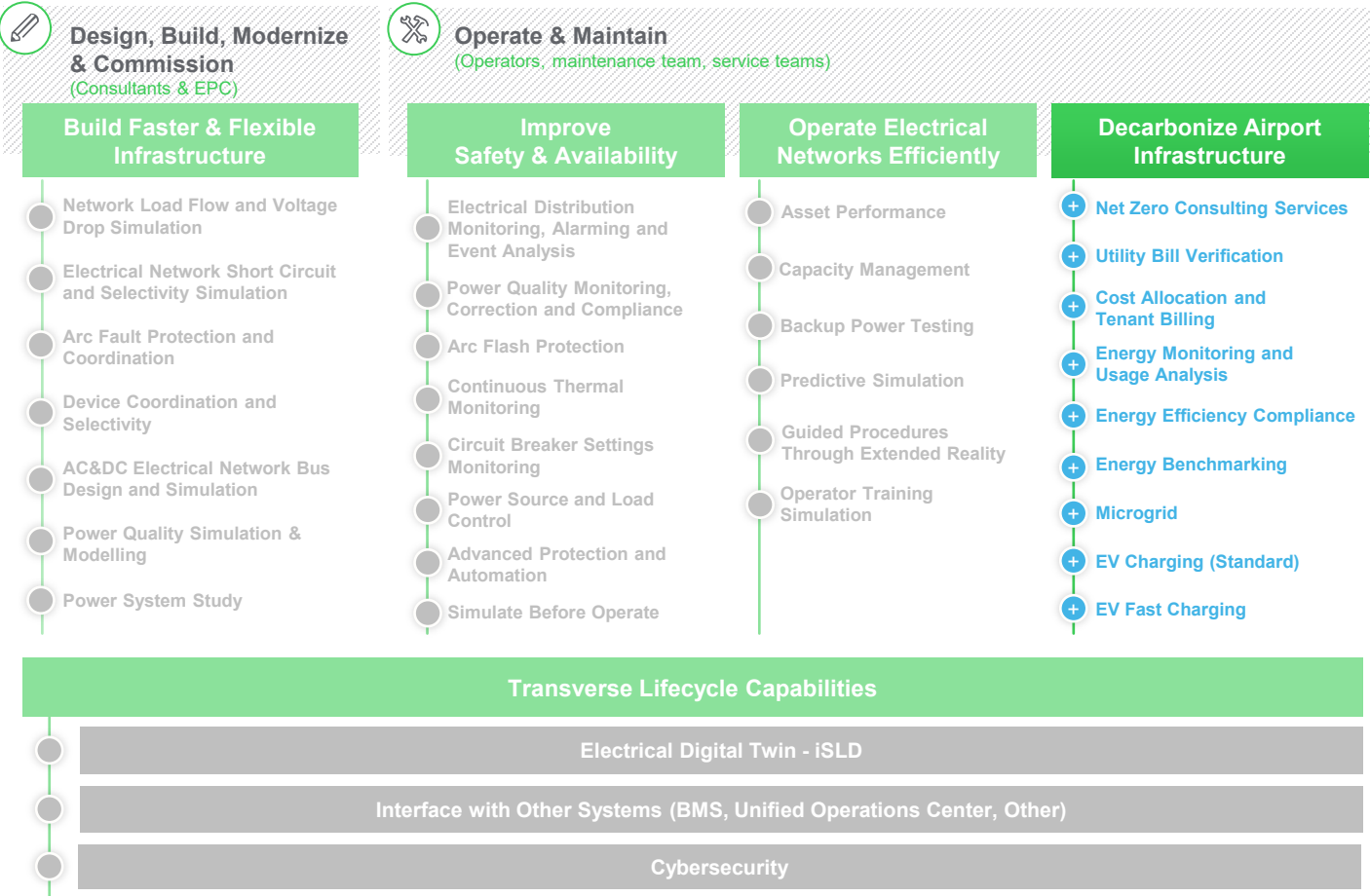
SECTION 2 – How EcoStruxure Power
Can Support the Airport Industry

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- Capabilities to Improve Safety & Availability
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- Capabilities to Decarbonize Airport Infrastruct. ▶
- Transverse Lifecycle Capabilities

BIBLIOGRAPHY

Capabilities to Decarbonize Airport Infrastructure





Net Zero Consulting Services

Track and reduce carbon emissions to demonstrate the carbon neutrality of the company

Primary Department

- Facility Management / Utilities Management
- Sustainability Office

Benefits

- Leverage our consulting services to define a Net Zero strategy.
- Implement the strategy using Schneider Electric Solutions to move towards Net Zero.

Define a Plan with Sustainability Schneider Consultants	
Scope 1 & 2	Scope 3
• Reduce electricity usage • Reduce/eliminate GHG fuel use • Source green electricity	• Reduce/eliminate aircraft emissions • Reduce/eliminate other third-party emissions



Execute with Schneider Electric Solutions – Key Actions to Lead			
ELECTRIFY Operations	REDUCE Energy Use	REPLACE Energy Source	ENGAGE Value Chain
• Develop new Electrical Distribution Infrastructure • Passenger car EV Charging • Fast/Smart charging (buses)	• Energy usage monitoring and analysis • Energy efficiency of terminal and other buildings	• Microgrid • Battery storage	• Circularity • Engage your ecosystem of tenants on decarbonization

Utility Bill Verification

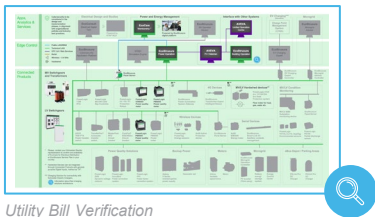
Identify billing errors in your utility bills

Primary Department

- Finance / Accounting Department
- Sustainability Office

Benefits

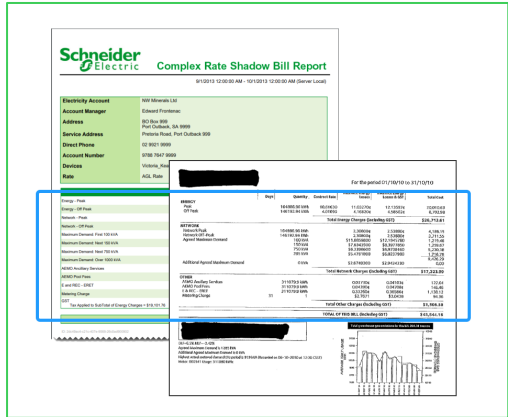
- Automatically generate a shadow bill of site energy consumption.
 - Measurement taken at the same location, same frequency and accuracy as the utility meter.
- Help identify billing errors.
 - Provide evidence to illustrate errors to the utility for cost savings.
- Identify opportunities to reduce consumption
 - Analyze over the course of billing periods.
 - Gain insights of billing “levers” to change behavior (peak shaving, demand response, etc.).



Utility Bill Verification
Reference Architecture

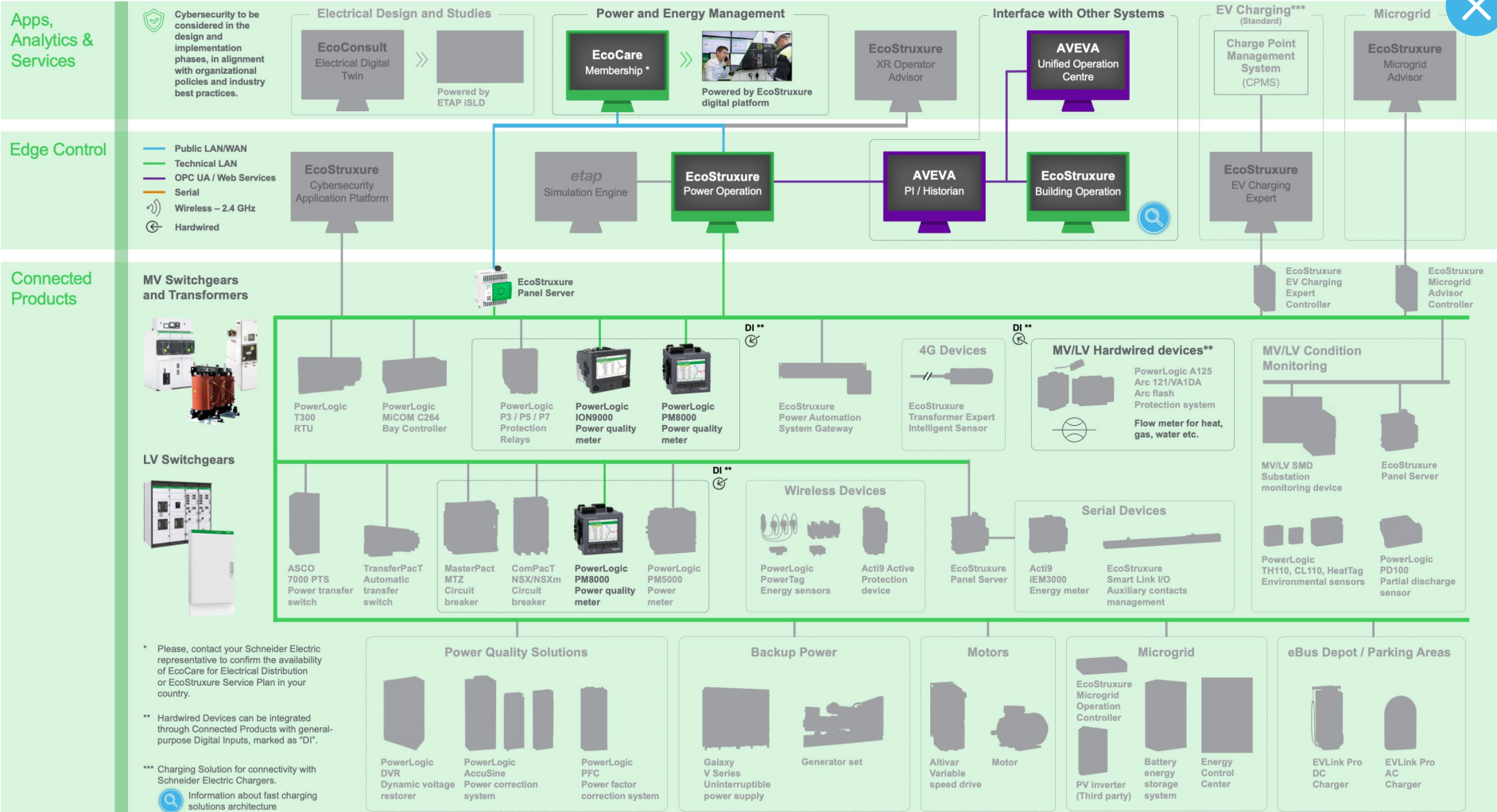
 **Learn more about:**

- Utility Bill Verification ([IEC](#))



Shadow Billing in EcoStruxure Power Operation

Utility Bill Verification Reference Architecture



Cost Allocation and Tenant Billing

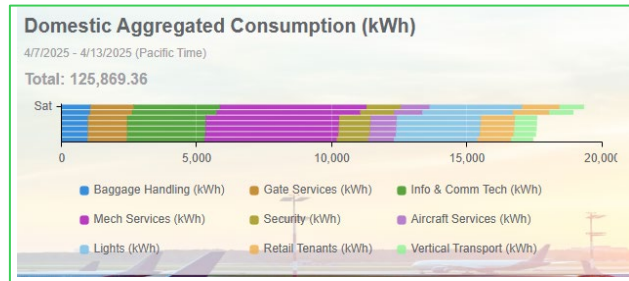
Identify energy saving by allocating costs across departments and tenants

Primary Department

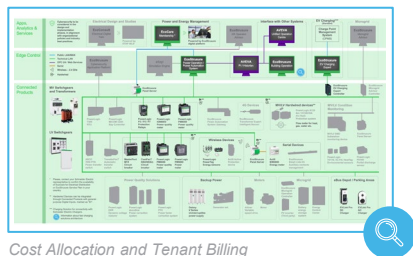
- Finance / Accounting Department
- Sustainability Office

Benefits

- Gain insight into which departments, processes, buildings, or floors are contributing to energy costs.
- Improve energy accountability by allocating costs to departments and tenants.
- Generate tenant energy billing for various tenants across the airport (Ex.: restaurants).



Energy Usage Breakdown Across Various Department and Tenants for Cost Allocation



Cost Allocation and Tenant Billing Reference Architecture

Learn more about:

- Cost Allocation (IEC)

Schneider
Electric

Multiple Billing Report

Date of Meter Reading: 2/1/2017 12:00:00 AM - 3/1/2017 12:00:00 AM (Server Local)

Areas	Book Store		
Rate	ShoppingStd Rate		
	Number of Units	Unit Cost	Cost (\$)
Energy Consumption Charge Victoria_Bertram.main (17 %): 3,846.09 kWh	3,846.09 kWh	\$0.05762	221.61
Peak Demand Charge [Book Store Peak @ 2/15/2017 3:00 PM] Victoria_Bertram.main (17 %): 13.16 kW	13.16 kW	\$6.89	90.65
Processing Fee			20.00
Total (\$)			332.26

Billing Report generated for a tenant in EcoStruxure Power Operation

Cost Allocation and Tenant Billing Reference Architecture

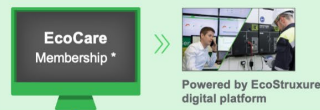
Apps, Analytics & Services

Cybersecurity to be considered in the design and implementation phases, in alignment with organizational policies and industry best practices.

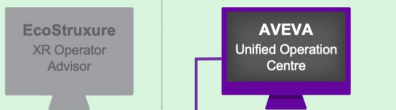
Electrical Design and Studies



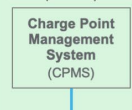
Power and Energy Management



Interface with Other Systems



EV Charging*** (Standard)

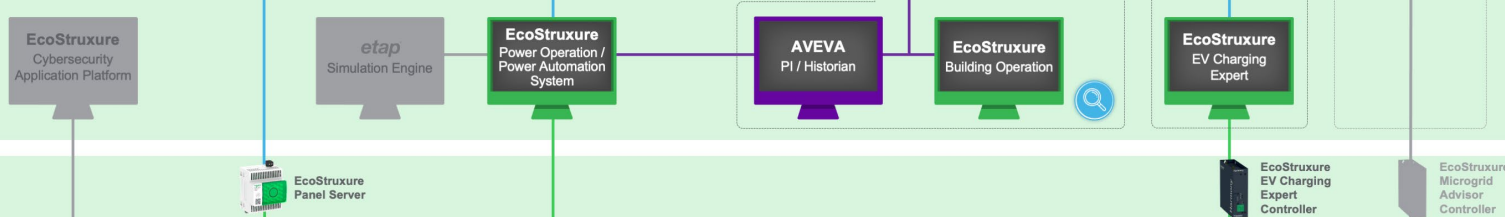


Microgrid



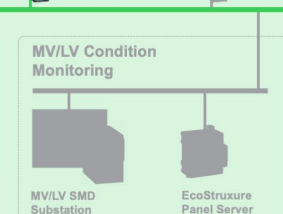
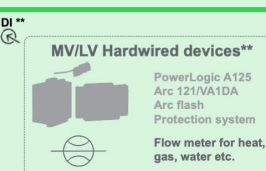
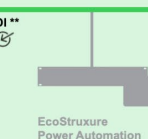
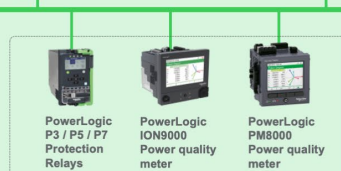
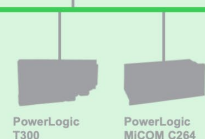
Edge Control

- Public LAN/WAN
- Technical LAN
- OPC UA / Web Services
- Serial
- Wireless – 2.4 GHz
- Hardwired

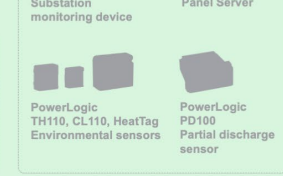
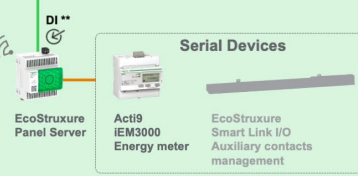
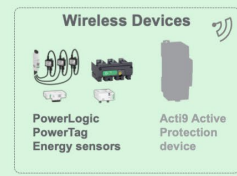
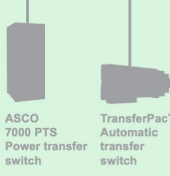


Connected Products

MV Switchgears and Transformers



LV Switchgears

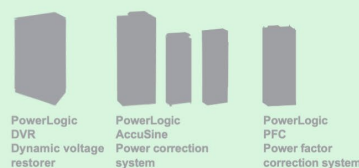


* Please, contact your Schneider Electric representative to confirm the availability of EcoCare for Electrical Distribution or EcoStruxure Service Plan in your country.

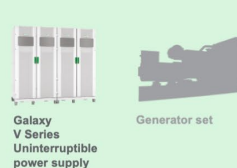
** Hardwired Devices can be integrated through Connected Products with general-purpose Digital Inputs, marked as "DI".

*** Charging Solution for connectivity with Schneider Electric Chargers.
Information about fast charging solutions architecture

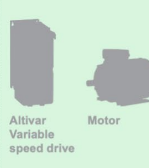
Power Quality Solutions



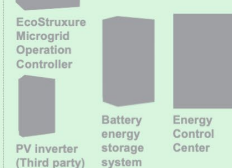
Backup Power



Motors



Microgrid



eBus Depot / Parking Areas



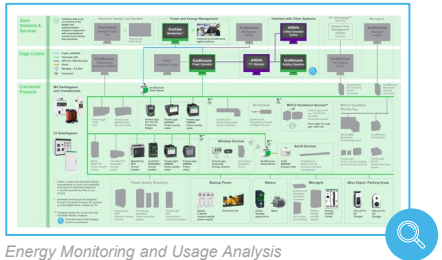
Determine where to focus energy conservation initiatives

Primary Department

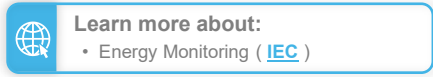
- Sustainability Office

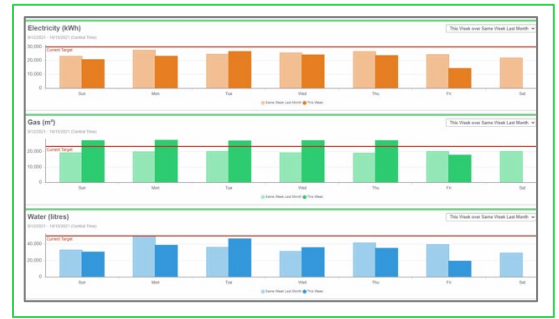
Benefits

- Bring awareness to utility consumption.
 - Turn data into easy-to-interpret graphical dashboards and reports to raise awareness amongst key stakeholders
- Identify “quick-win” opportunities for energy savings:
 - By comparing and visualizing energy usage and cost for different utilities over different time periods;
 - By identifying and prioritizing which areas lend themselves to a high energy-saving return on investment.



Energy Monitoring and Usage Analysis
Reference Architecture





Energy Usage Analysis Dashboards in EcoStruxure Power Operation

Energy Monitoring and Usage Analysis Reference Architecture

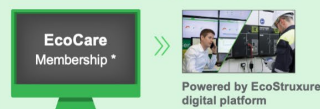
Apps, Analytics & Services

Cybersecurity to be considered in the design and implementation phases, in alignment with organizational policies and industry best practices.

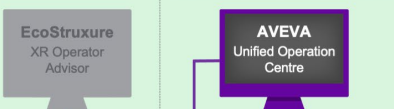
Electrical Design and Studies



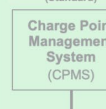
Power and Energy Management



Interface with Other Systems



EV Charging*** (Standard)

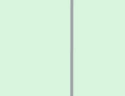
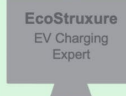
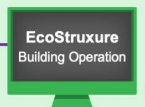
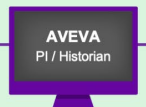
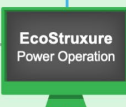
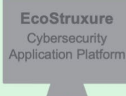


Microgrid



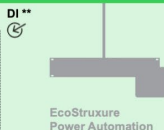
Edge Control

- Public LAN/WAN
- Technical LAN
- OPC UA / Web Services
- Serial
- Wireless – 2.4 GHz
- Hardwired

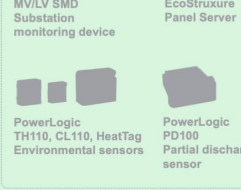
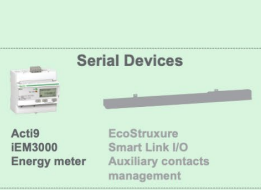


Connected Products

MV Switchgears and Transformers



LV Switchgears

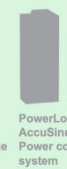


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*** Charging Solution for connectivity with Schneider Electric Chargers.
Information about fast charging solutions architecture

Power Quality Solutions



Backup Power



Motors



Microgrid



eBus Depot / Parking Areas



Energy Efficiency Compliance

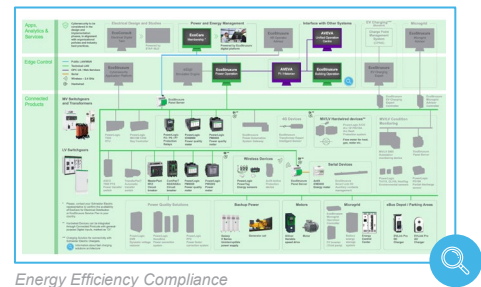
Comply with standards related to energy management systems

Primary Department

- Sustainability Office

Benefits

- Report and show facility compliance to local sustainability requirements:
 - To benefit from tax credits;
 - To gain credibility to participate in new projects.



Energy Efficiency Compliance Reference Architecture



Sustainable Organizations and Standards



EcoStruxure Resource Advisor Dashboard in EcoStruxure Power Operation

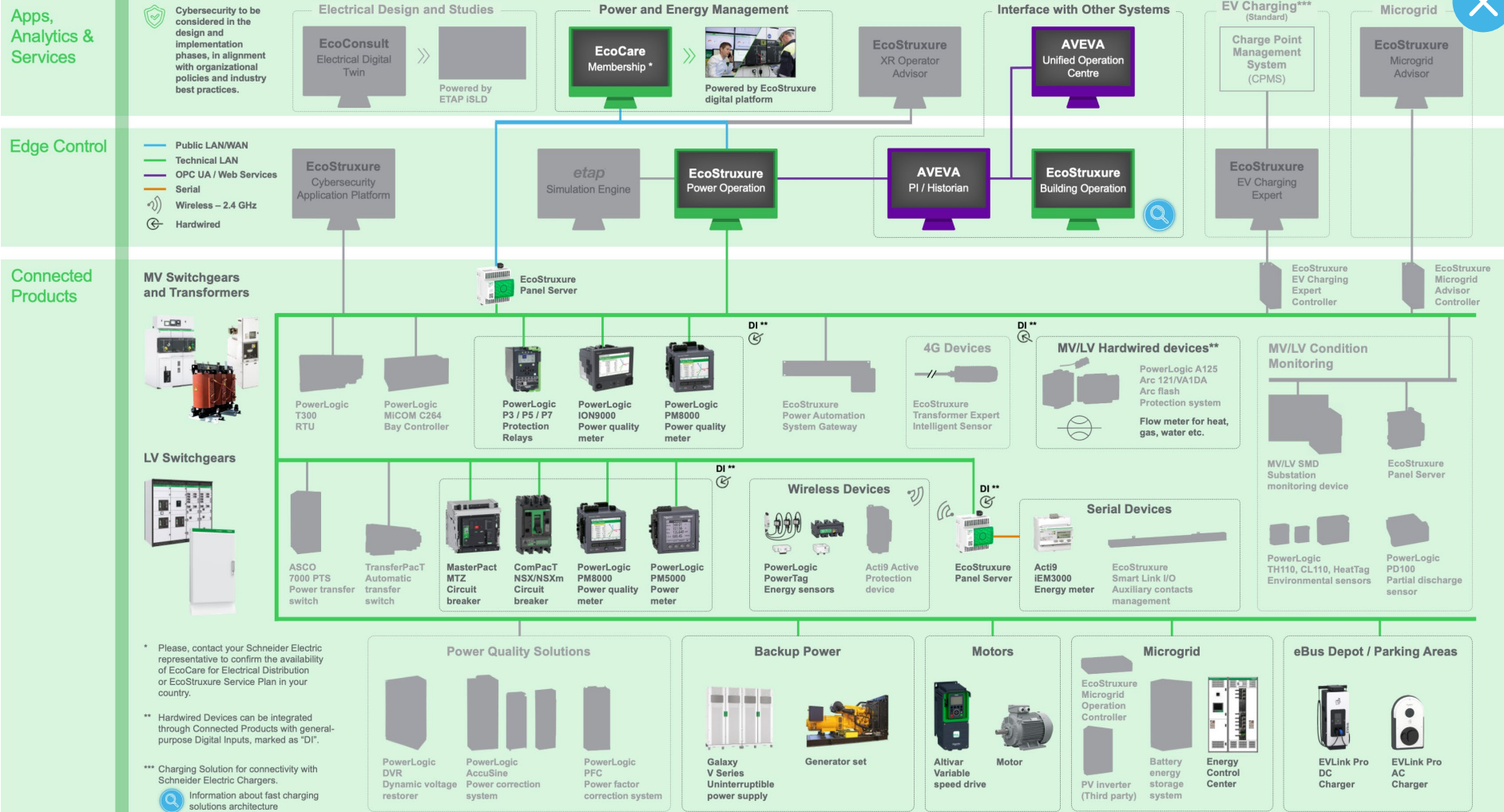


EcoStruxure Power Operation Energy Star Compliance Dashboard

Learn more about:

- Energy Efficiency Compliance ([IEC](#))

Energy Efficiency Compliance Reference Architecture





Energy Benchmarking

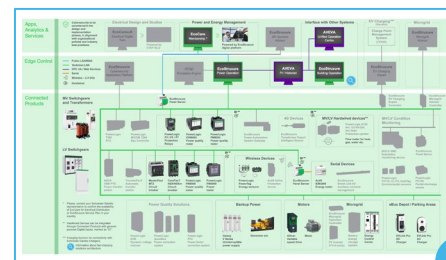
Benchmark the efficiency of energies across facilities, zones or organizations

Primary Department

- Facility Management / Utilities Management
- Sustainability Office

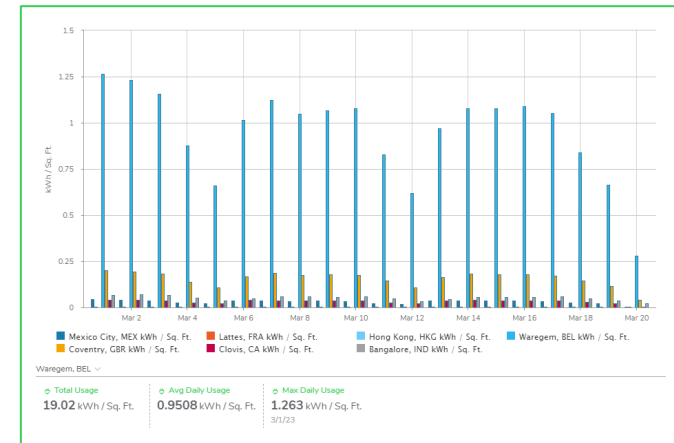
Benefits

- Track and report energy and waste (e.g. water) in one single place.
- Provide a comparison of energy usage with normalized consumption.



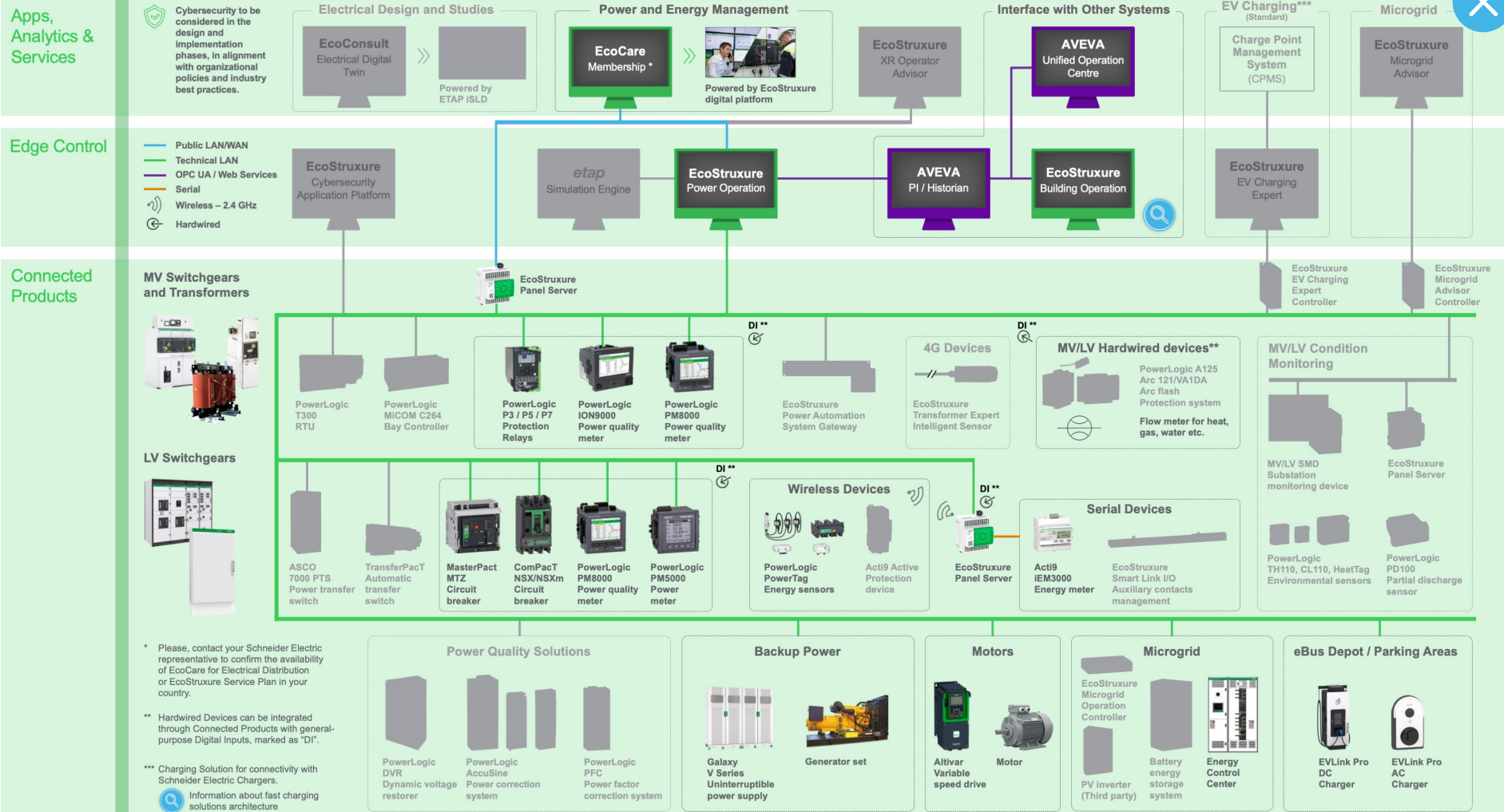
Energy Benchmarking
Reference Architecture

Learn more about:
• Energy Benchmarking ([IEC](#))



Multi-Site Reporting and Dashboard Examples in EcoStruxure Resource Advisor

Energy Benchmark Reference Architecture



EcoStruxure™ Power for Airports (IEC)

SECTION 1 – Introduction to the Airport Industry

SECTION 2 – How EcoStruxure Power Can Support the Airport Industry

SECTION 3 – Digital Solutions & Services

Introduction

Overview of Digital Solutions & Services

Capabilities to Build Faster Flexible Infrastruct.

Capabilities to Improve Safety & Availability

Capabilities to Operate Elec. Networks Efficient.

Capabilities to Decarbonize Airport Infrastruct. ▶

Transverse Lifecycle Capabilities

BIBLIOGRAPHY



Microgrid

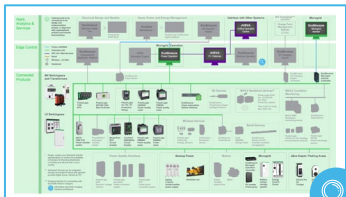
Reduce carbon footprint by leveraging Distributed Energy Resources (DER)

Primary Department

- Project Procurement / Delivery
- Design Firms
- Facility Management / Utilities Management

Benefits

- Enhance power system reliability, despite grid instability often resulting from powerful storms and grid unavailability.
- Build renewable energy models combined with full spectrum power system analysis calculations for:
 - Accurate simulation;
 - Predictive analysis;
 - Equipment sizing;
 - Field verification of wind, solar farms and other DERs.

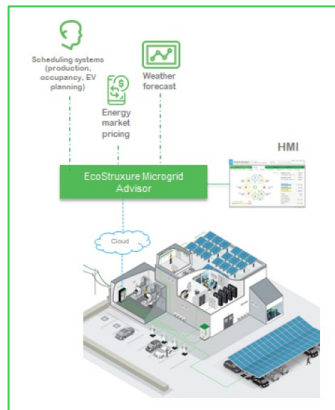


Microgrid
Reference Architecture

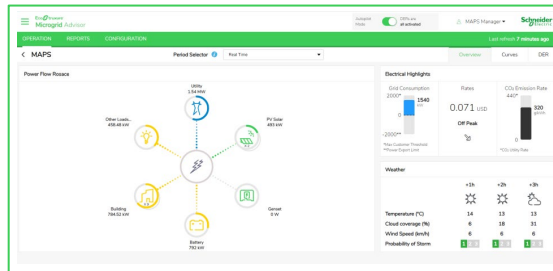


Learn more about:

- Microgrid ([IEC](#))



Principle of Microgrid Simulation



Microgrid Management in EcoStruxure Microgrid Advisor

Microgrid Reference Architecture

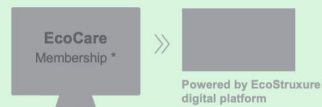
Apps, Analytics & Services

Cybersecurity to be considered in the design and implementation phases, in alignment with organizational policies and industry best practices.

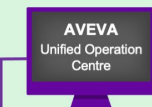
Electrical Design and Studies



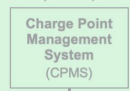
Asset, Power and Energy Management



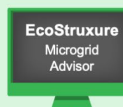
Interface with Other Systems



EV Charging*** (Standard)

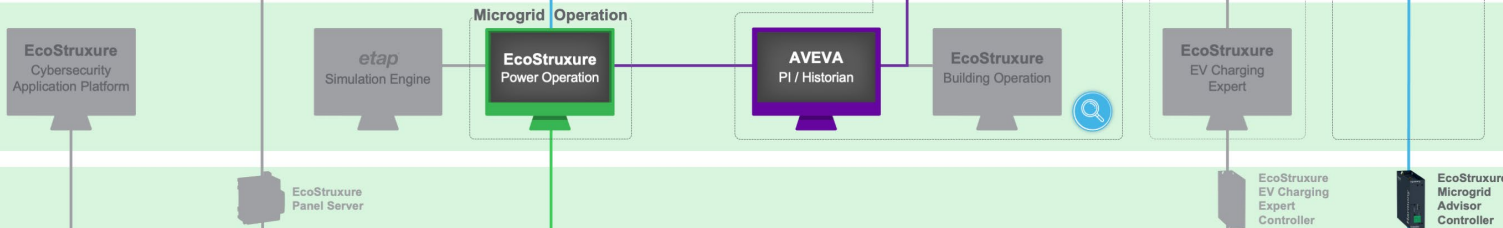


Microgrid



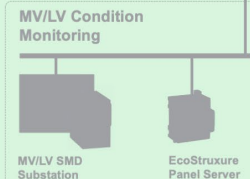
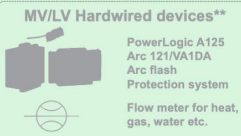
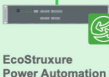
Edge Control

- Public LAN/WAN
- Technical LAN
- OPC UA / Web Services
- Serial
- Wireless – 2.4 GHz
- Hardwired

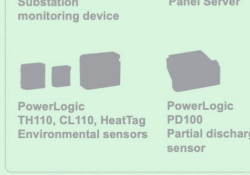
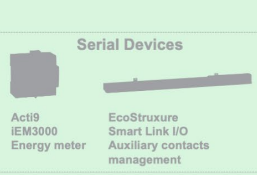
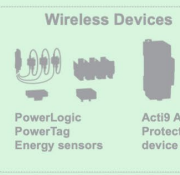


Connected Products

MV Switchgears and Transformers



LV Switchgears



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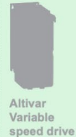
Power Quality Solutions



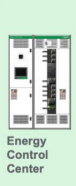
Backup Power



Motors



Microgrid



eBus Depot / Parking Areas



- Introduction
- Overview of Digital Solutions & Services
- Capabilities to Build Faster Flexible Infrastruct.
- Capabilities to Improve Safety & Availability
- Capabilities to Operate Elec. Networks Efficient.
- Capabilities to Decarbonize Airport Infrastruct. ▶
- Transverse Lifecycle Capabilities

EV Charging (Standard)

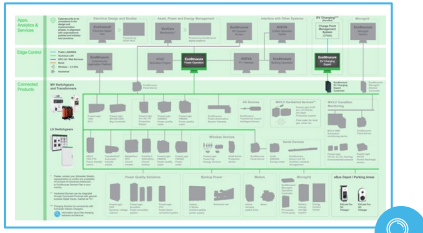
Manage smart loads, monitor and control remotely passenger vehicles

Primary Department

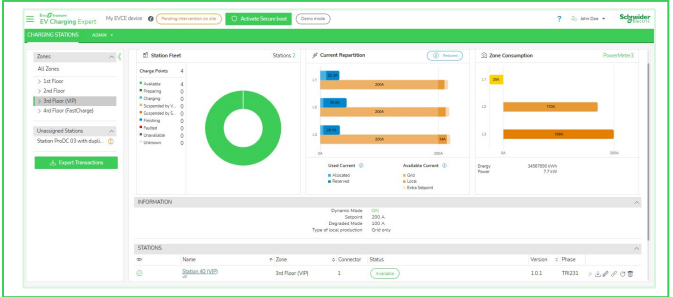
- Facility / Utilities Management
- Sustainability Office

Benefits

- Integrate seamlessly with Schneider Electric branded chargers.
- Optimize energy allocation to EV infrastructure in real time, based on energy demand (EV + other loads) and defined system settings.
- Control charging stations remotely (start, stop, reboot, etc.).



EV Charging (Standard)
Reference Architecture



Charging Station details in EcoStruxure EV Charging Expert.

EV Charging (Standard) Reference Architecture

Apps, Analytics & Services

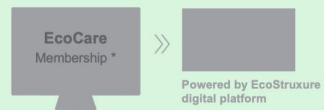


Cybersecurity to be considered in the design and implementation phases, in alignment with organizational policies and industry best practices.

Electrical Design and Studies



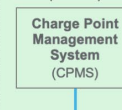
Asset, Power and Energy Management



Interface with Other Systems



EV Charging*** (Standard)

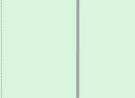
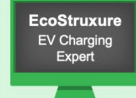
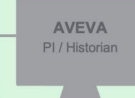
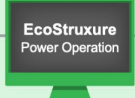
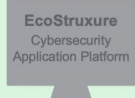


Microgrid



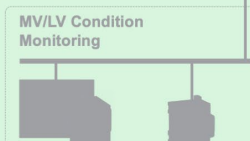
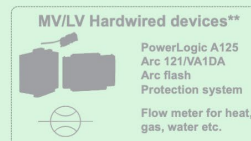
Edge Control

- Public LAN/WAN
- Technical LAN
- OPC UA / Web Services
- Serial
- Wireless – 2.4 GHz
- Hardwired

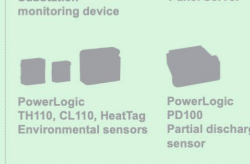
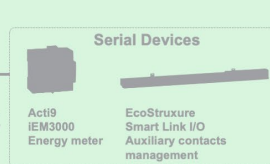
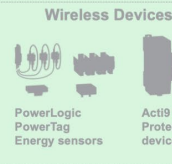


Connected Products

MV Switchgears and Transformers



LV Switchgears



* Please, contact your Schneider Electric representative to confirm the availability of EcoCare for Electrical Distribution or EcoStruxure Service Plan in your country.

** Hardwired Devices can be integrated through Connected Products with general-purpose Digital Inputs, marked as "DI".

*** Charging Solution for connectivity with Schneider Electric Chargers.
Information about fast charging solutions architecture

Power Quality Solutions



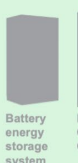
Backup Power



Motors



Microgrid



eBus Depot / Parking Areas



EV Fast Charging

Enable dynamic energy & load management system for smart EV charging needs

Primary Department

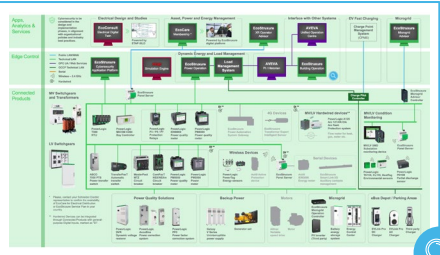
- Procurement / Delivery
- Facility / Utilities Management

Benefits

- Use a platform capable of connecting different charger brands and types.
- Optimize energy by dynamically varying the charging scenarios to prevent costly peak loads, using a reliable local load management system.
- Option to Increase site resiliency for optimal charge performance with multi-source energy.



Fast Charging Solution for Airports



EV Fast Charging
Reference Architecture

EV Fast Charging Reference Architecture

Apps, Analytics & Services

Cybersecurity to be considered in the design and implementation phases, in alignment with organizational policies and industry best practices.

Electrical Design and Studies

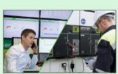
EcoConsult
Electrical Digital Twin



Powered by ETAP ISLD

Asset, Power and Energy Management

EcoCare
Membership *



Powered by EcoStruxure digital platform

EcoStruxure
XR Operator Advisor

Interface with Other Systems

AVEVA
Unified Operation Centre

EV Fast Charging

Charge Point Management System (CPMS)

Microgrid

EcoStruxure
Microgrid Advisor

Edge Control

- Public LAN/WAN
- Technical LAN
- OPC UA / Web Services
- OCPP Technical LAN
- Serial
- Wireless – 2.4 GHz
- Hardwired

EcoStruxure
Cybersecurity Application Platform

etap
Simulation Engine

Dynamic Energy and Load Management

EcoStruxure
Power Operation

Load Management System

AVEVA
PI / Historian

EcoStruxure
Building Operation

Connected Products

MV Switchgears and Transformers



PowerLogic
T300 RTU

PowerLogic
MICOM C264 Bay Controller

PowerLogic
P3 / P5 / P7 Protection Relays

PowerLogic
ION9000 Power quality meter

PowerLogic
PM8000 Power quality meter

DI **

EcoStruxure
Power Automation System Gateway

4G Devices
EcoStruxure
Transformer Expert Intelligent Sensor

DI **

MV/LV Hardwired devices**
PowerLogic A125 Arc 121/VA1DA Arc flash Protection system
Flow meter for heat, gas, water etc.

LV Switchgears



ASCO
7000 PTS Power transfer switch

TransferPacT
Automatic transfer switch

MasterPacT
MTZ Circuit breaker

ComPacT
NSX/NSXm Circuit breaker

PowerLogic
PM8000 Power quality meter

PowerLogic
PM5000 Power meter

DI **

Wireless Devices
PowerLogic PowerTag Energy sensors
Acti9 Active Protection device

EcoStruxure
Panel Server

Serial Devices
Acti9 IEM3000 Energy meter
EcoStruxure Smart Link I/O Auxiliary contacts management

Charge Pilot Controller

EcoStruxure
Microgrid Advisor Controller

MV/LV Condition Monitoring

MV/LV SMD
Substation monitoring device

EcoStruxure
Panel Server

PowerLogic
TH110, CL110, HeatTag Environmental sensors

PowerLogic
PD100 Partial discharge sensor

* Please, contact your Schneider Electric representative to confirm the availability of EcoCare for Electrical Distribution or EcoStruxure Service Plan in your country.

** Hardwired Devices can be integrated through Connected Products with general-purpose Digital Inputs, marked as "DI".

Power Quality Solutions

PowerLogic
DVR Dynamic voltage restorer

PowerLogic
AccuSine Power correction system

PowerLogic
PFC Power factor correction system

Backup Power

Galaxy
V Series Uninterruptible power supply

Generator set

Motors

Altivar
Variable speed drive

Motor

Microgrid

EcoStruxure
Microgrid Operation Controller
PV inverter (Third party)

Battery
energy storage system

Energy
Control Center

eBus Depot / Parking Areas

EVLink Pro
DC Charger

EVLink Pro
AC Charger

Third party
Charger

SECTION 1 – Introduction to
the Airport Industry

SECTION 2 – How EcoStruxure Power
Can Support the Airport Industry

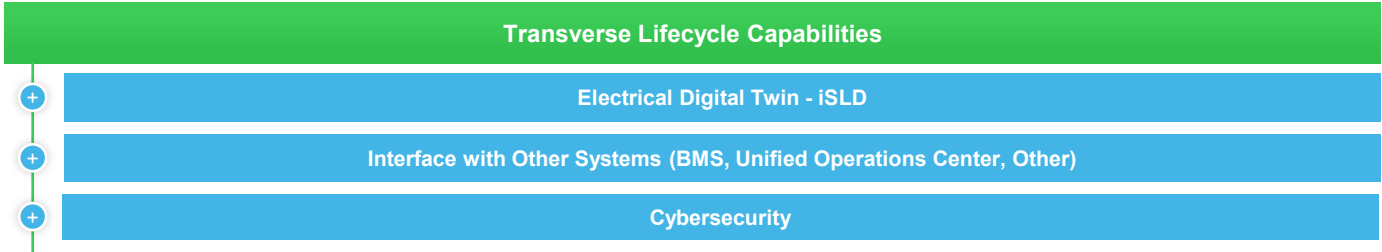
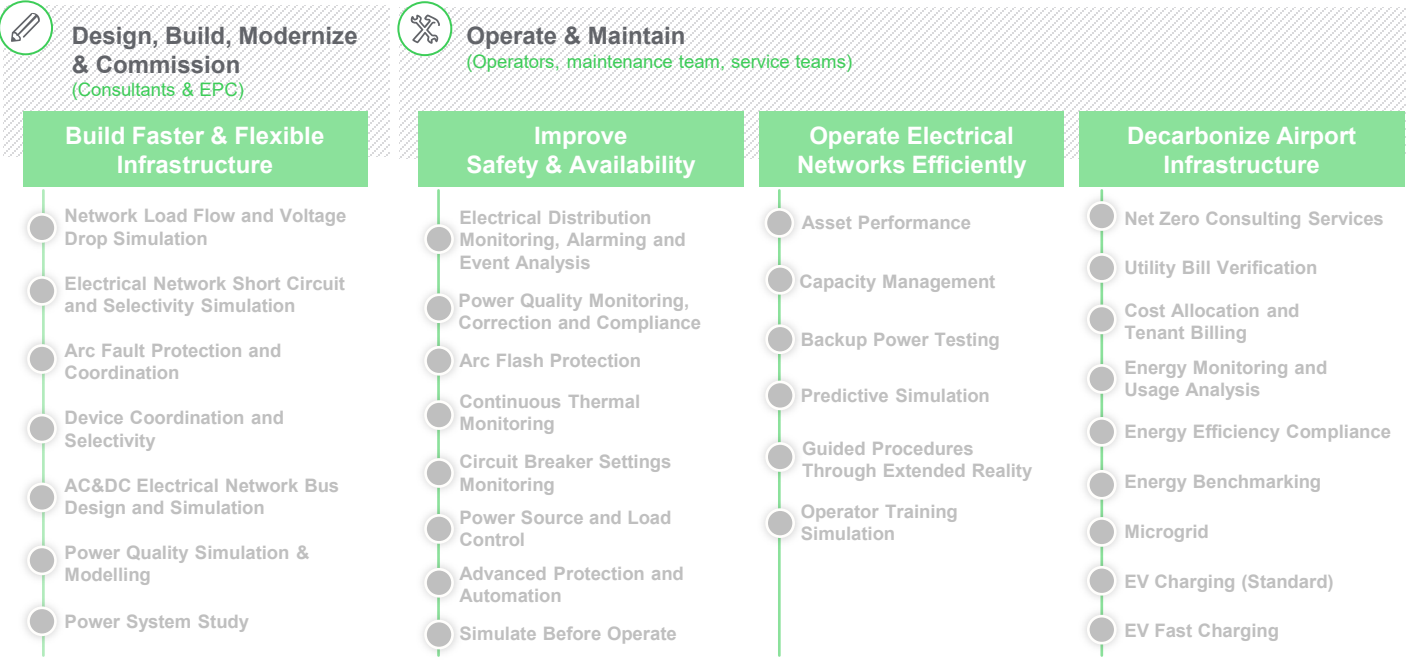
SECTION 3 – Digital Solutions
& Services

- Introduction
- Overview of Digital Solutions & Services
- Capabilities to Build Faster Flexible Infrastruct.
- Capabilities to Improve Safety & Availability
- Capabilities to Operate Elec. Networks Efficient.
- Capabilities to Decarbonize Airport Infrastruct.

Transverse Lifecycle Capabilities ▶

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Transverse Lifecycle Capabilities



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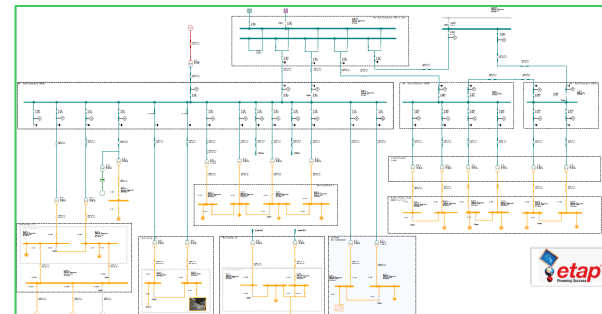


Electrical Digital Twin – iSLD

Provide End to End Digital Engineering

Benefits

- Provide intelligent user interface for all levels of AC networks, with seamless data flow across the project.
- Simplify creation and commissioning of electrical or control panels with a complex workflow and technical detailing.
- Enable users, from the design to operate phases, to model, simulate, analyze and validate electrical power systems to predict their electrical network behavior.



Electrical Digital Twin Interface



Design Firm



EPC / Main Contractor



Panel Builder / Installer



Operator / Site Manager



End User

Design & Simulate



- Create, configure, customize, and manage your electrical system model



- Enable automated calculations, sizing, and diagrams



- Provide BIM-based electrical design solution

Engineer & Build

SEE

- Create wiring diagrams, 3D- panel design
- Manage workflow with digital FAT, document transfer, and much more

Operate & Maintain

Monitor and predict system behaviour using real-time data from smart meters or SCADA.



- Operate with design knowledge
- Design with operation knowledge
- Help prevent system interruption
- Accelerate operator training

EcoStruxure™ Power for Airports (IEC)**SECTION 1 – Introduction to the Airport Industry****SECTION 2 – How EcoStruxure Power Can Support the Airport Industry****SECTION 3 – Digital Solutions & Services**

Introduction

Overview of Digital Solutions & Services

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Transverse Lifecycle Capabilities ▶

BIBLIOGRAPHY

Interface with Other Systems: Building Management System (BMS)

Why integrate mechanical and electrical systems?

Need for data aggregation

Facility infrastructure is experiencing a convergence of information and operational systems. This is particularly true for Airport applications, where mechanical and electrical systems are essential infrastructure.

These systems are rapidly generating increasing amounts of data, with the addition of new sensors, meters, and other smart equipment. It is crucial to have robust software system with proper data aggregation from these devices.

Benefits of systems integration

Integrating the systems:

- Creates a unified interface for visualizing, analyzing, and reporting data, simplifying daily tasks for operations and maintenance staff;
- Enables applications to utilize context from both systems to optimize the decision-making processes;
- Enhances overall Operational efficiency

Examples of mechanical and electrical systems integration in Airport

- **Energy performance monitoring:** Track and model facility energy usage;
- **Asset management:** View mechanical and electrical asset performance in one place;
- **Fault management:** Detect faults and respond through an integrated interface.

**Learn more about:**

- Data Integration and Interoperability between Systems ([IEC](#))

**Interface with
Unified Operations Center**

EcoStruxure™ Power for Airports (IEC)

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Transverse Lifecycle Capabilities

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Interface with Other Systems: Building Management Systems (BMS)

How is data acquired and integrated within the architecture?

Data Integration

The method/tool to integrate the data depends on the data type, and on the direction of the transfer:

From: EcoStruxure Power Operation (EPO) with Advanced Reporting and Dashboards

To: EcoStruxure Building Operation (EBO)

The integration is performed through:

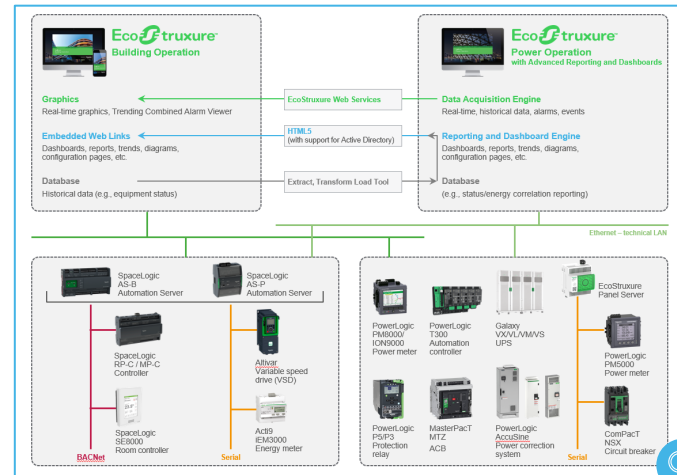
- **EcoStruxure Web Services**
Used for real-time data, alarms, and historical data
- **Web interface integration** (Single Sign On)
Used for power and energy dashboards, graphical diagrams, trends, reports, and configuration pages.

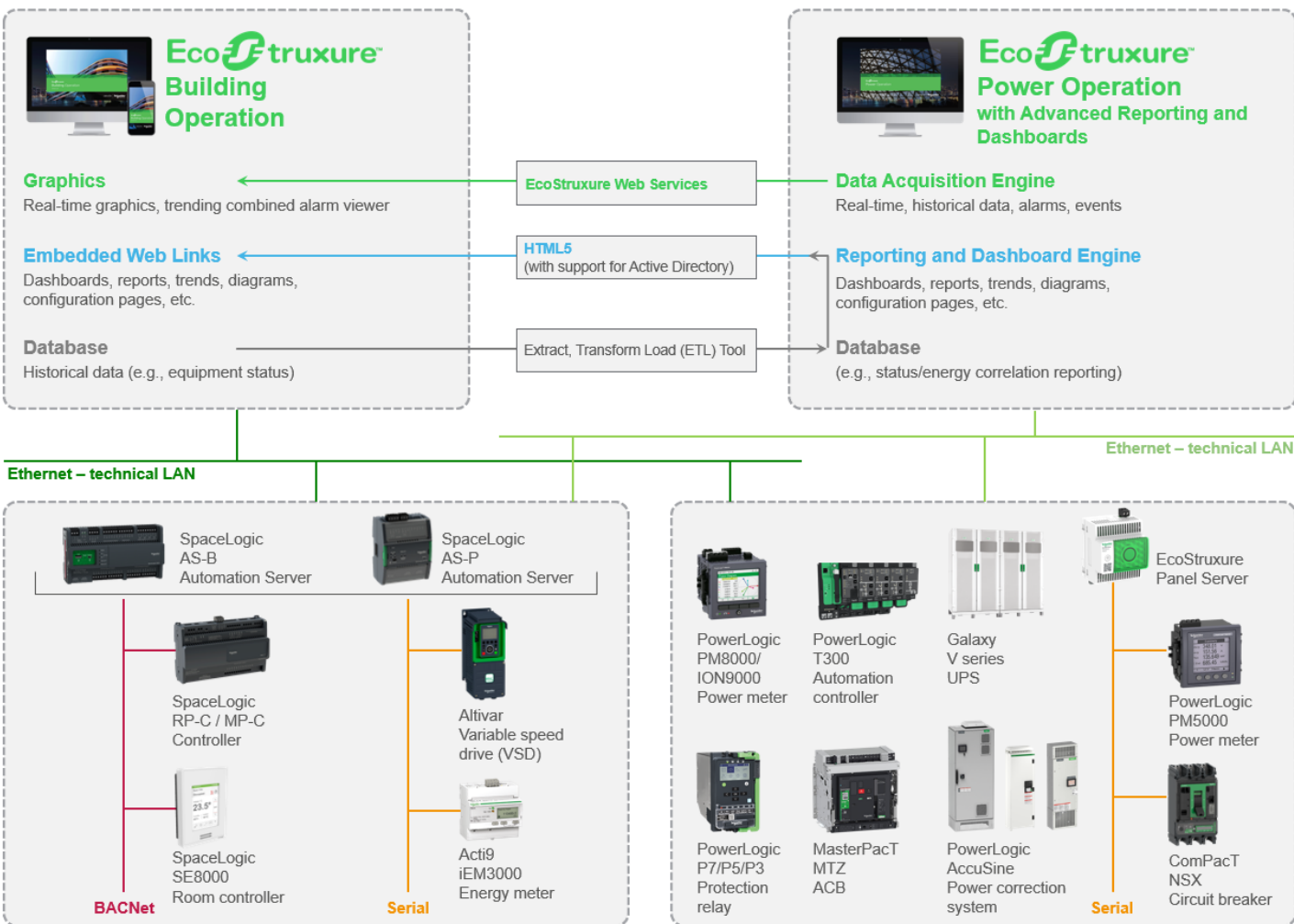
From: EcoStruxure Building Operation (EBO)

To: EcoStruxure Power Operation (EPO) with Advanced Reporting and Dashboards

The integration is performed through:

- **An Extract Transform Load functions**
Used for historical building management data to enable energy data correlation.





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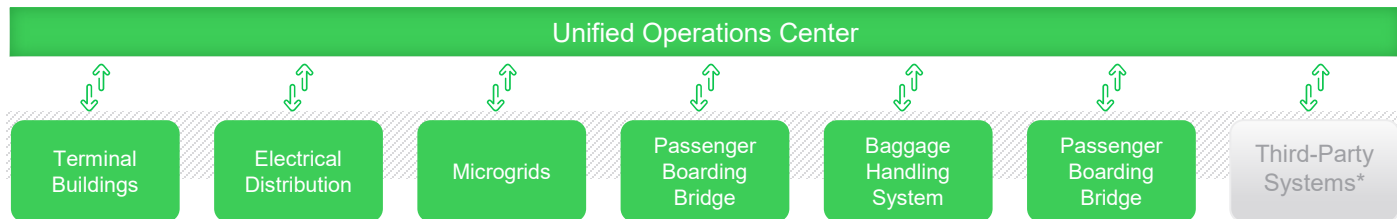
BIBLIOGRAPHY



Interface with Other Systems: Unified Operations Center

Visualize and manage complex operations by converging data from different sources

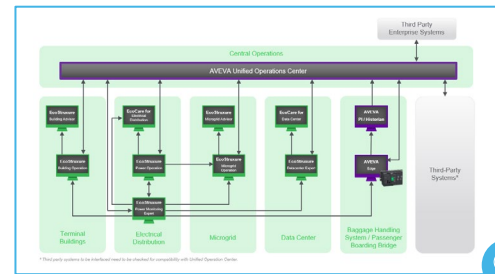
AVEVA Unified Operations Center integrates data from various sources like Electrical Distribution, Building Management Systems, Baggage Handling Systems, the airport operational database and other infrastructure / operational systems.



* Third party systems to be interfaced need to be checked for compatibility with UoC.

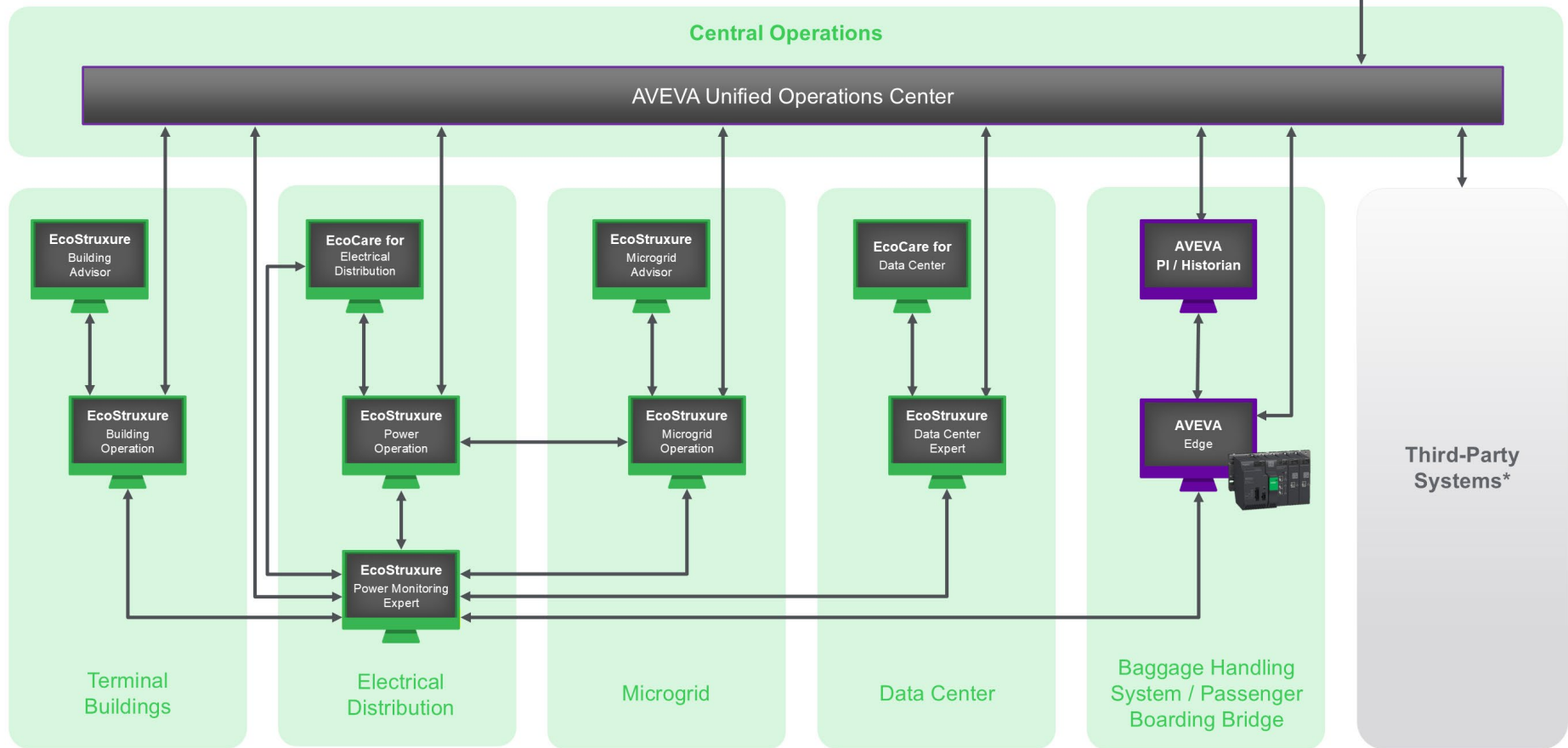
Benefits

- Provide a centralized view of operations in an airport to help airport infrastructure optimize on assets and operations.
- Enable coordinated efforts and break siloes between different department using a shared platform.
- Improve organizational performance.



Unified Operations
Reference Architecture





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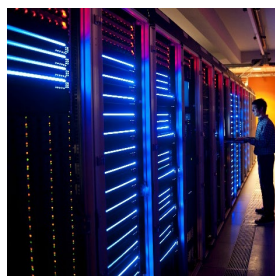
Cybersecurity

Challenges faced by Airports today



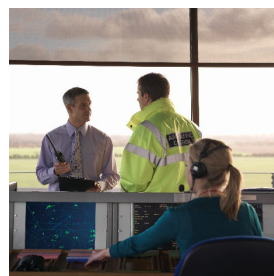
High Level of System Complexity

- Over 200 types of airports systems vulnerable to attacks
- A web of inter-dependance between systems
- Many systems critical to airport operations
- Numerous attack vectors



Increasing Sophistication of Attacks

- Criminals and nation states using increasingly sophisticated tools, challenging airports' existing cybersecurity budgets
- Rapidly changing threat landscape, requiring constant reassessment and updating of the implementations



A complex Ecosystem of Stakeholders

- Numerous stakeholders: government agencies, airport operators, airlines, contractors, consultants, suppliers, concessionaires and passengers
- Increasing data flows between stakeholder systems with increased digitalization



Multiple Regulations and Standards

- Local government regulations for airports and/or critical infrastructure in general
- Regional regulation (such as those from the EU)
- Global standards like ISO 27001 and IEC 62443

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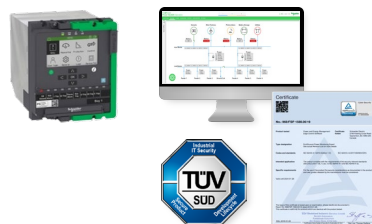
Cybersecurity

Our solutions to support cybersecurity journey

At Schneider Electric, we can:

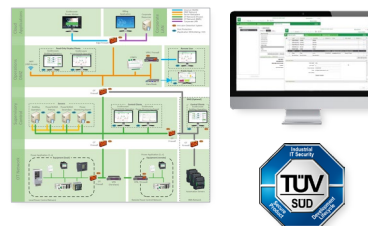
- Provide a selection of cybersecurity certified products
- Provide certified system architectures and solutions
- Deliver lifecycle services

Certified products



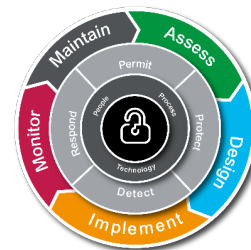
Certified products developed according to IEC 62443 functional requirements with Secure Development Lifecycle processes.

Certified systems & solutions



Certified secure system architecture according to IEC 62443-3-3 with documented processes and solutions for a secure system.
Cybersecurity system configuration software for consistent security policy deployment.

Lifecycle services



Consulting services from design, implementation, operations and maintenance to tailor your security solutions to your strategy and budget.



Learn more about:

- Cybersecurity ([IEC](#))



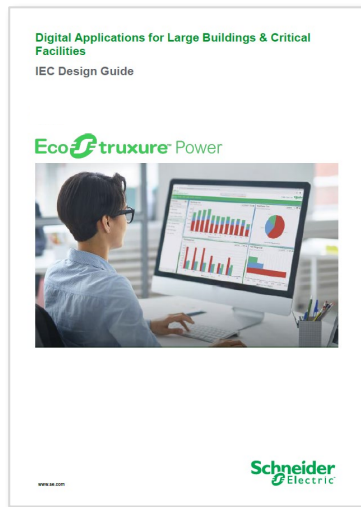
BIBLIOGRAPHY

BIBLIOGRAPHY



Reference Documents

Design Guide



Digital Applications for Large Buildings and Critical Facilities

The Digital Applications Design Guide provides comprehensive details on the building blocks of EcoStruxure Power: the IoT applications are driven by a software layer to control the traditional electrical distribution infrastructure.

Developed to help engineering consultants and designers, this guide is an invaluable resource for specifying, designing and prescribing EcoStruxure Power architectures capable of performing one or more of the business-driven applications described within.



General Landing page (Gives access to PDF versions):

<https://www.se.com/ww/en/work/campaign/innovation/power-digital-applications-design-guide.jsp>

Quick links for the digital IEC Guide

Ref: ESXP2G001EN



- [Table of Contents](#)
- [General Methodology for Designing Digital Applications](#)
- [Overview of Digital Applications](#)

Quick links for the digital NEMA Guide

Ref: 0100DB1802



- [Table of Contents](#)
- [General Methodology for Designing Digital Applications](#)
- [Overview of Digital Applications](#)

Useful Links

Transportation solutions

Discover EcoStruxure Power solutions for Transportation.

Life is On

Schneider Electric

Search products, documents & more

Q

IMPACT Company

Products Software Services Solutions Homeowner Support Company

Solutions / Transportation

Low-carbon transportation solutions

Airport decarbonisation e-book
Discover how airports can lead the way in reducing carbon emissions and achieving sustainability goals.
Get the e-book

EcoStruxure IoT solutions for Transportation

With IoT-enabled, future-ready platform, EcoStruxure™ for Transportation, we provide the transportation solutions of tomorrow and deliver the best customer experience through digital solutions in smart airports and ports, urban transportation, and rail solutions.

Smart airports

Smart ports

Urban and rail transportation solutions



<https://www.se.com/ww/en/work/solutions/transportation/>

EcoStruxure™ Power for Airports (IEC)

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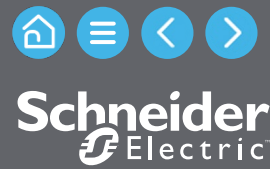
SECTION 3 – Digital Solutions & Services

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Reference Documents

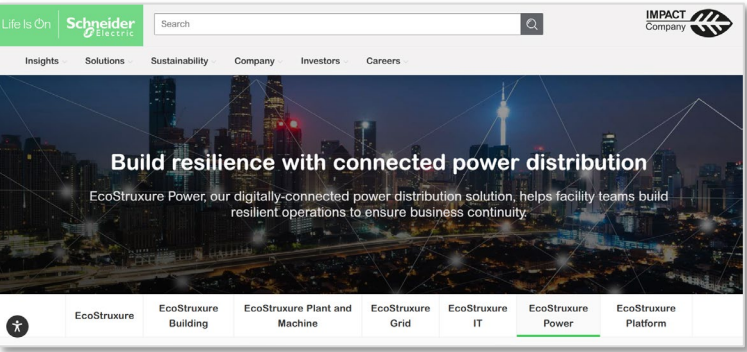
Useful Links

Environmental Data Program



Useful Links

EcoStruxure Power solutions on se.com



- Discover about EcoStruxure Power.
- Understand the benefits of a digitized power distribution.
- Find the latest documentation published



<https://www.se.com/ww/en/work/campaign/innovation/power-distribution.jsp>

EcoStruxure Power Reference Guides for Other Industries

Click on a link, then select your country:



[ESXP2RG001EN](#)

[ESXP2RG002EN](#)

[ESXP2RG003EN](#)

[ESXP2RG004EN](#)

[ESXP2RG005EN \(IEC\)](#)

[ESXP2RG006EN](#)

[0100DB2303 \(NEMA\)](#)



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& Services

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Useful Links

Environmental Data Program ▶

Environmental Data Program

The need to address ESG regulations (ESG = Environmental, Social, and Governance)

Governments are committing to carbon neutrality by 2050, **leading to new regulations promoting sustainability**: ESG reporting is becoming crucial.

The Corporate Sustainability Reporting Directive (CSRD) expands disclosure requirements to nearly 50,000 companies, including those outside the EU. **This enhances transparency and accountability.**

Consumer expectations and greenwashing risks

Consumers demand sustainable practices, with a rise in repairing, reselling, and reusing products.

However, **greenwashing remains a challenge**, as some companies make unsubstantiated sustainability claims. Regulators are cracking down on false claims, **emphasizing the need for credible and verifiable environmental data.**

At Schneider Electric, we have deployed an Environmental Data Program to address this need. Discover more next page.

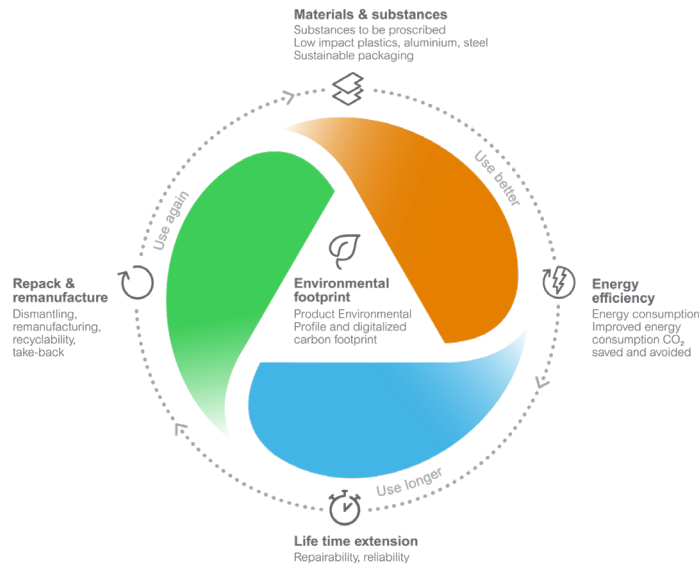


Environmental Data Program

Next-level transparency for better-informed product choices

The Environmental Data Program is a framework for how we, at Schneider Electric, measure, categorize, and compare the environmental attributes and footprint of our products.

Using a rigorous, fact-based methodology, the program provides environmental data from across the product lifecycle.



Use Better: How sustainable a product is, including environmental footprint, materials and substances, packaging, and energy efficiency.

Use Longer: How a product's lifetime can be effectively extended in terms of repairability and updatability.

Use Again: How a product can be reused, from dismantling and remanufacturing to recyclability and manufacturer take back.

With this **transparent, fact-based data**, customers and partners are empowered to **make conscious environmental choices** and accurately evaluate and report on sustainability performance.

All our hardware offers have an associated environmental data available on se.com product pages.



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92000 Nanterre
France

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