Clean Energy Business Council
مجلس صناعات الطاقة النظيفة
Middle East & North Africa
الشرق الأوسط وشمال افريقيا

CEBC Clean Energy Webinar Series
Webinar #8

"Digitalization of the Energy Sector: Landscape and Opportunities"

Mohammed W. Ayoub
Regional Growth Leader – GE Grid Solutions

GE Renewable Energy

Ahmed Fateen
Power Systems VP – Middle East & East Africa

Schneider Electric

Mark Daly
Digital Industries Analyst

BloombergNEF

Sam Sankaran
Director

Guidehouse

Clean Energy Business Council

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Clean Energy Business Council (CEBC)

Ahmed Samir Elbermbali

Strategy and Operations Manager

What is the Clean Energy Business Council?

- **The Clean Energy Business Council,** a Not for Profit membership company, is the pre-eminent organization representing the private sector involved in the clean energy sector across the MENA region.
- Our goal is to **establish a dialogue** between the public and private sectors, and to drive the development of appropriate and much needed **regulation and policy** to support the development of the clean energy sector.

Clean Energy Business Council
Middle East & North Africa
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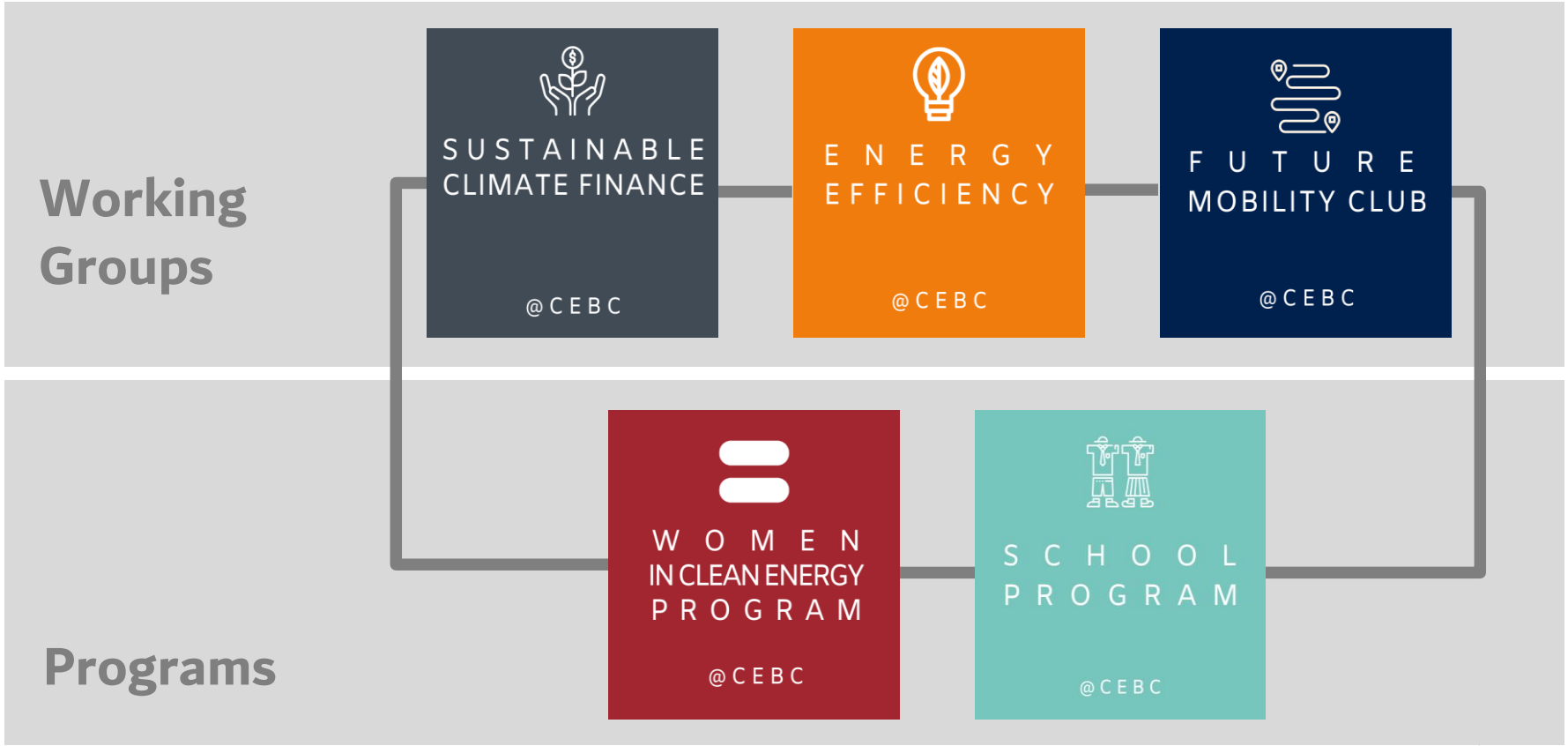
What we do

- We are the **key organization** representing the private sector involved in the clean energy and renewable energy sectors across the MENA region.
- We work on behalf of our members to promote the uptake of renewable and clean technologies, through **partnerships** with Government and stakeholders, **events** and opportunities to **collaborate.**
- We also develop and present **policy solutions**, in conjunction with our member organisations.
- We provide **advocacy and thought leadership** for the sector.

What we do - continued

- Throughout the year, we **host workshops, events and webinars**, allowing our members the opportunity to share and promote their ideas, services and knowledge.
- We publish **reports, case studies, white papers and market survey**s.
- We run a range of **working groups**, such as the future mobility working group, the energy efficiency group and the climate finance group.
- We also run two **programmes**: the Schools Programme and the Women in Clean Energy (WICE) programme.

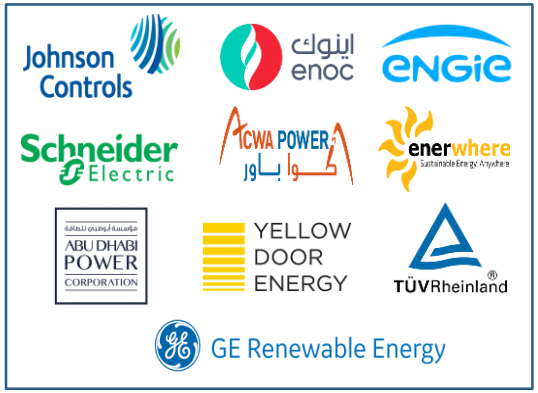
CEBC workstream structure



CEBC Members (+120)

and more…

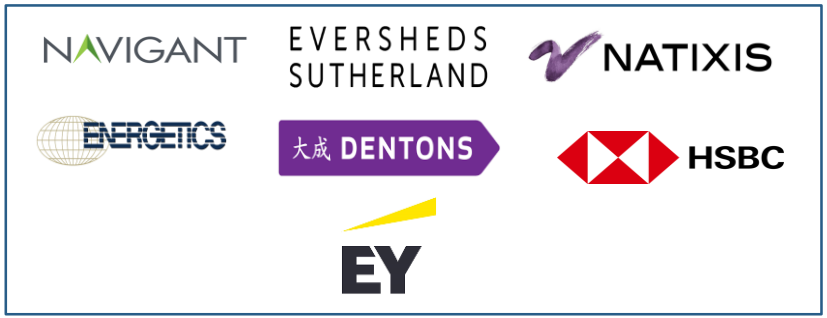
Renewables



Energy Efficiency

Green Mobility

Law, Consultancy, Banks and Investment Firms



Other

CEBC Partners


Looking forward to meeting
you in person soon ☺

Thanks for listening

Email us at ahmed@cebcmena.com

Or visit our website at

http://www.cebcmena.com

Join our next webinars

"Electric Vehicle Deployment and Carbon Emissions in **Saudi Arabia:** A Power System Perspective"

2nd of July, 2:00 PM GST

Clean Energy Business Council — Middle East & North Africa
مجلس صناعات الطاقة النظيفة — الشرق الأوسط وشمال افريقيا

KAPSARC
مركز الملك عبدالله للدراسات والبحوث البترولية
King Abdullah Petroleum Studies and Research Center

Dr. Amro Elshurafa
Research Fellow
King Abdullah Petroleum Studies and Research Center

Dr. Raed Bkayrat
Senior Adviser
Clean Energy Business Council
Moderator

Live Webinar and Signing Ceremony

CEBC's Women in Clean Energy (WICE) & Canada's Women in Renewable Energy (WiRE)

15th of July, 5:00 PM GST

WICE women in clean energy

WiRE

Clean Energy Business Council — Middle East & North Africa
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H.E. Marcy Grossman
Ambassador of Canada to the UAE

Aisha Bukhari
Board Member of WiRE
Senior Manager, Partnerships at MaRS Discovery District

Annette Hollas
Manager, Natural Resources Canada & Chair of C3E Initiative

Florence Fontani
EVP of Strategy, Communications & ESR at ENGIE Middle East, South & Central Asia & Turkey

Mhairi Main Garcia
Partner, Dentons
Vice-chair, CEBC

Habiba Al Mar'ashi
Chairperson
Emirates Environmental Group (EEG)

Joanna Osawe
Chair, President & CEO
Women in Renewable Energy (WiRE)

www.cebcmena.com

Become a member: ahmed@cebcmena.com

Digitalizing the Energy Sector

Mohammed W. Ayoub

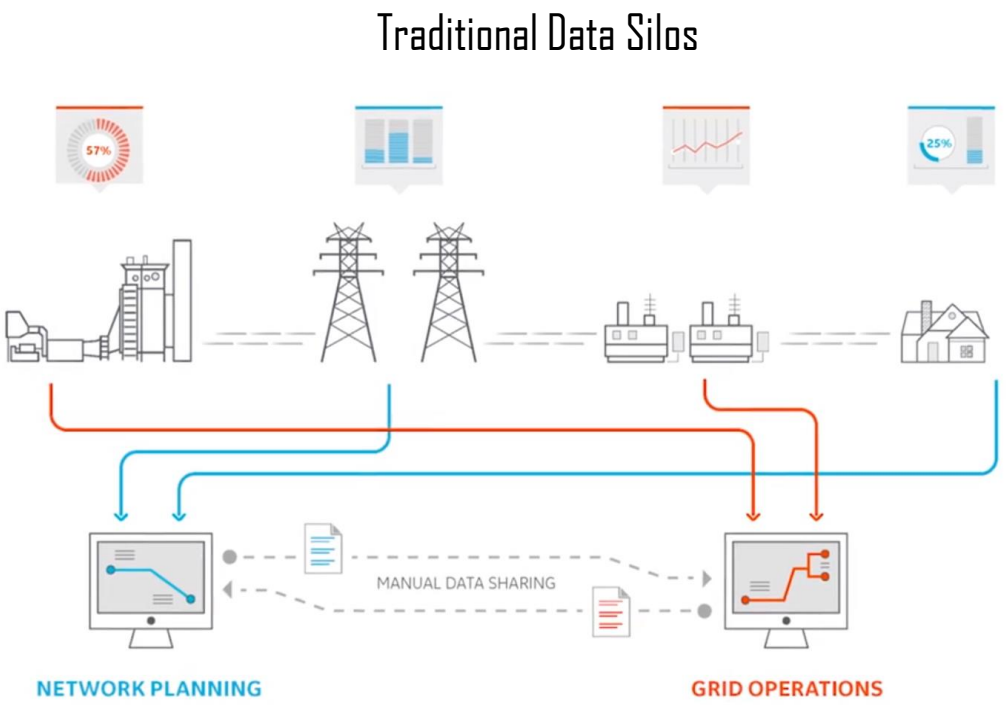
Regional Growth Leader – Grid Solutions

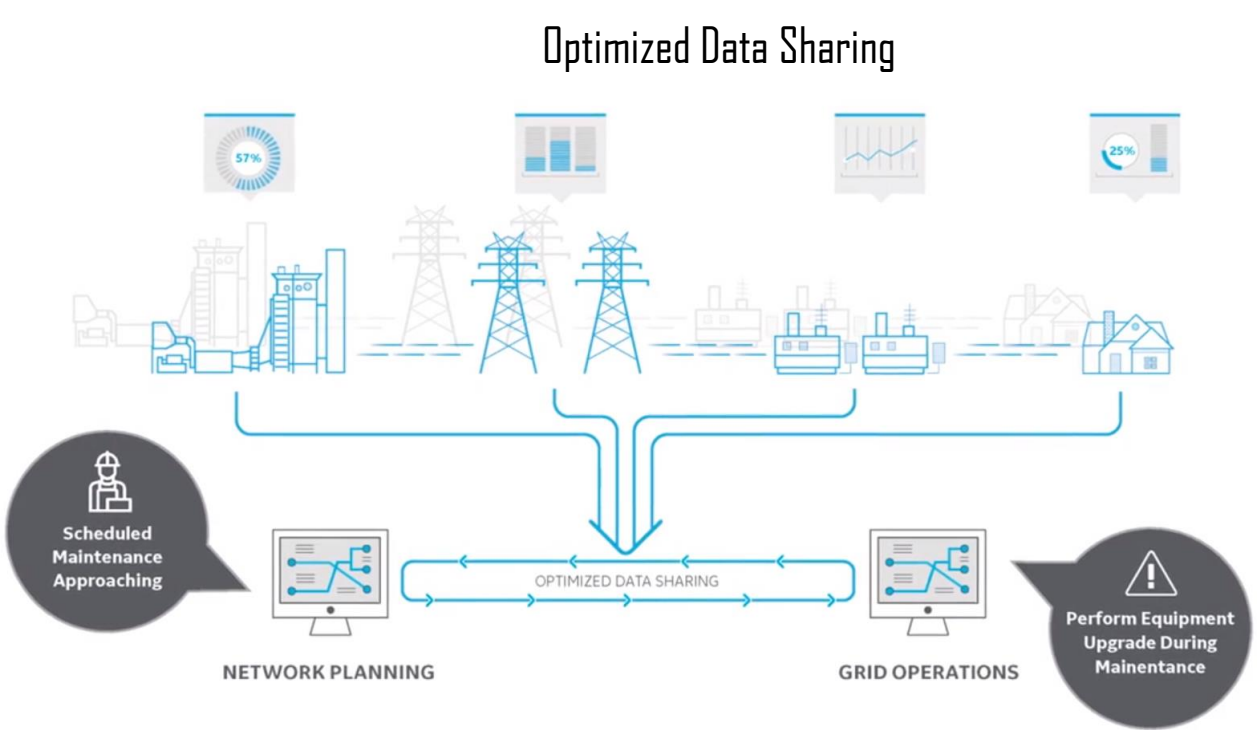
Whole Industry in **Transition**

Global electricity industry is undergoing a radical transformation… Every generator, T&D and consumer is getting connected causing increased complexity and matrix interactions – driving new business models.

DECARBONIZATION **ELECTRIFICATION** **DECENTRALIZATION** **DIGITIZATION**

Moving towards Network Digital Twin





- Unidirectional Flow of Energy
- Traditionally designed network/capacity
- Static control with passive insights

- Multi-directional Flow of Energy
- Optimized and flexible network Design
- Dynamic control with real time measurements

$15B revenue • 40,000 employees

GE RENEWABLE ENERGY

Broadest portfolio in the industry; gives us scale, scope and capability to fulfill our mission

Grid in a Changing Energy Landscape

GE IS ENABLING THE CREATION OF A GREENER, MORE RESILIENT AND RELIABLE POWER SYSTEM

HELPING TO MEET GROWING ENERGY DEMANDS

Challenge

Global Electricity Consumption is expected to grow 46% by 2025

Solution

Add capacity of 150,000MVA/yr from power transformers, 50% reduction in substation footprint

HV equipment and turnkey solutions, automation & software, microgrids

UPGRADING AGING INFRASTRUCTURE

Challenge

70% of transformers in developed countries are over 25 years old

Solution

Maximizing asset utilization by up to 15% and identifying equipment issues in advance

Digital substations, turnkey solutions, equipment, refurbishment services, APM

ENABLING RENEWABLES & A DIVERSIFIED ENERGY MIX

Challenge

Clean renewables will account for 38% of the global power generation capacity by 2025

Solution

More than 10GW transmitted from the North Sea to German South load centers

Electrical balance of plant, HV direct current, DER and energy management systems

IMPROVING GRID RESILIENCE AND ENERGY EFFICIENCY

Challenge

336GW of distributed power to be installed globally by 2024 for improved grid reliability

Solution

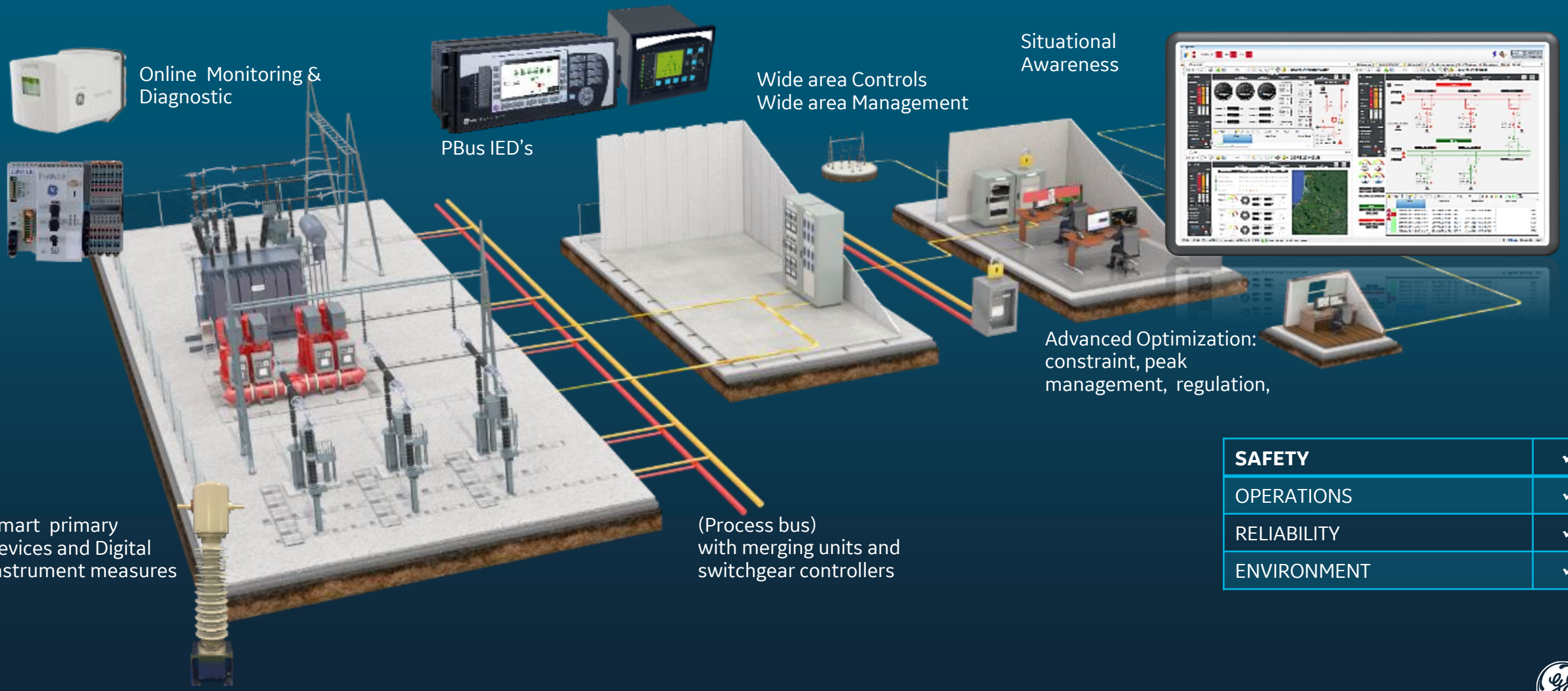
Enabling 3x power capacity, longer distance and lower costs

HV direct current systems, flexible AC transmission systems, microgrids

FROM POWER PLANT TO POWER CONSUMER, WE ARE **ENABLING GRID MODERNIZATION**

Digital Substation Intelligent Features

Future proof design , Operational Flexibility and enhanced reliability.



SAFETY	✓
OPERATIONS	✓
RELIABILITY	✓
ENVIRONMENT	✓

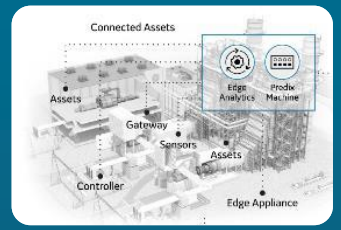
ALM DIGITAL SERVICES

DATA COLLECTION

Inspection




Data Consolidation & Connectivity

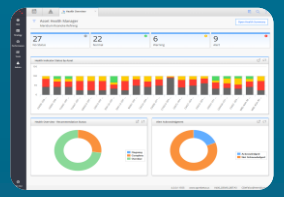



On-Line Monitoring

Oil Lab. Analysis

GridAPM

Modeling & Analytics



Visibility & Insight

IT Admin & Support

OPTIMIZATION SERVICES

Work and Asset Management

Maintenance & Repair

Modernization & Replacement

OUTCOMES

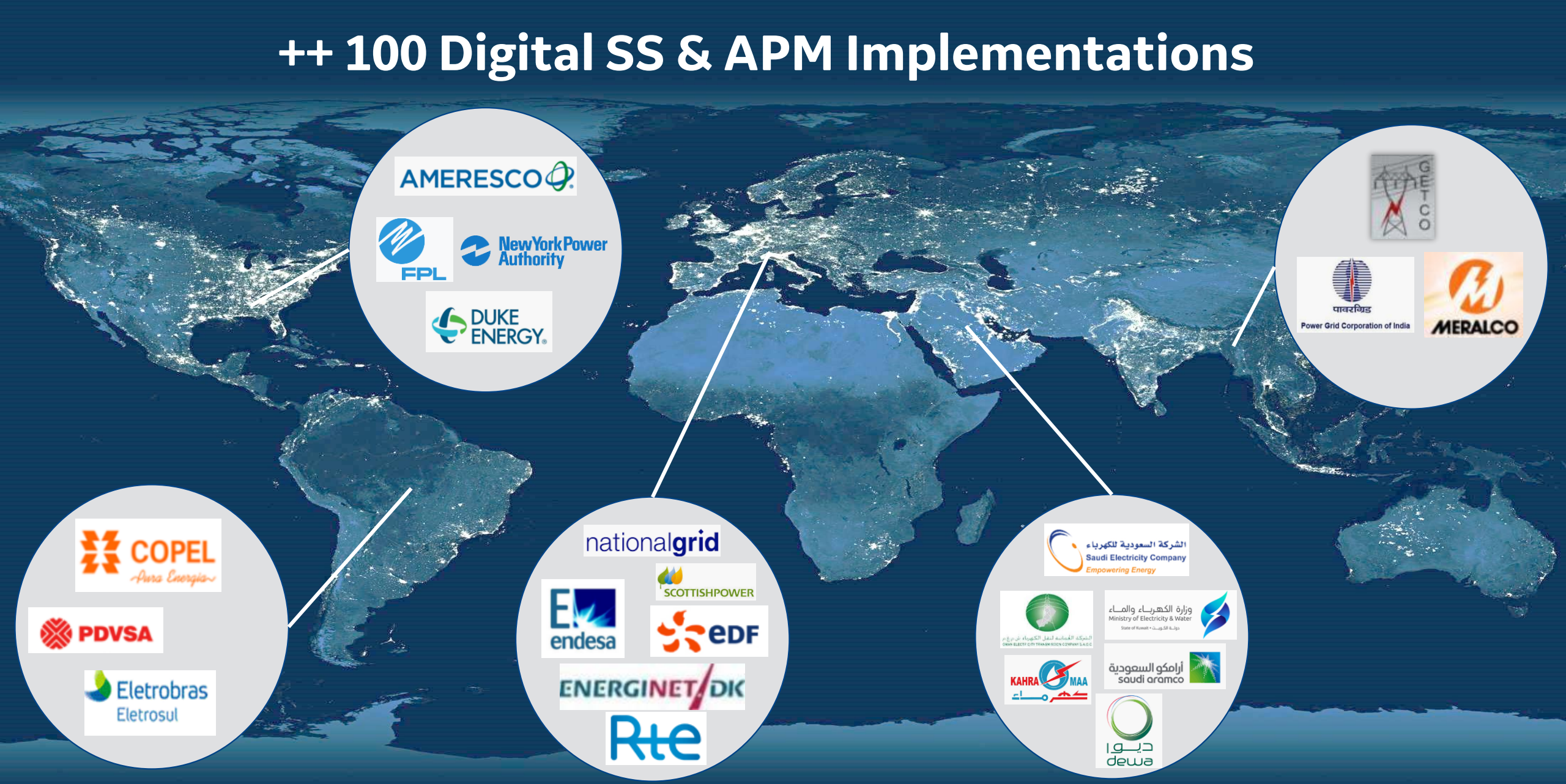
Data Collection strategy

Asset Model Customization

Operation & Maintenance Optimization

SUPPORT & CONSULTING

++ 100 Digital SS & APM Implementations



...Partnering with Utilities in a journey towards Network Digital Twin

EcoStruxure™ for Electricity Companies

Life Is On | Schneider Electric

Schneider Electric provides energy and automation digital solutions for efficiency and sustainability

Key figures for 2018

5% of revenues devoted to R&D

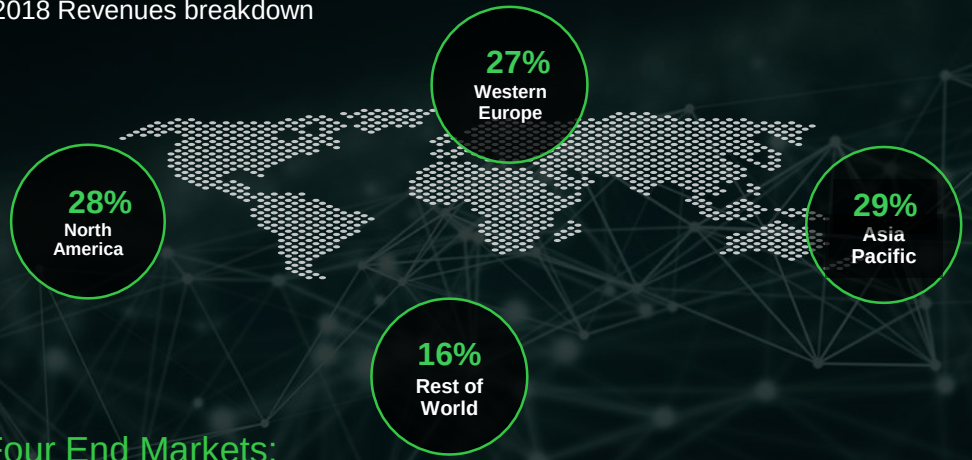
€26 billion
2018 revenues

42%
of revenues in new economies

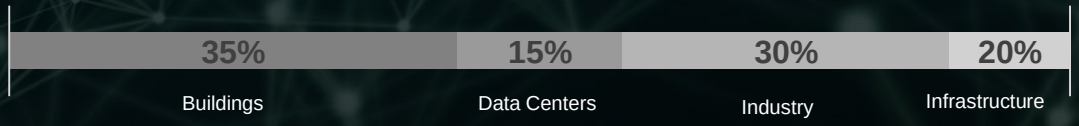
137,000+
Employees in over 100 countries

A well-balanced global presence

2018 Revenues breakdown



Four End Markets:



Life Is On Schneider Electric

OUR PURPOSE

We empower all to make the most of their energy and resources ensuring Life Is On everywhere, for everyone, at every moment.

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Energy Efficiency

Savings
Electrification
Decarbonization

Efficiency

for a Sustainable Future

Process Efficiency

Sustainability
Asset Performance
Productivity

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Digital innovation is exploding at breakneck speed

IoT

35%

of 5G apps in the manufacturing and utilities sectors

**GSMA 2019*

Big Data

> 5x

generated data from 33 ZBs today to 175 ZBs by 2025

**IDC, 2018*

AI

6x

worldwide spending on cognitive and AI systems btw 2017 & 2022

** International data corporation*

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OUR MISSION

We provide energy and automation digital solutions for efficiency and sustainability.

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EcoStruxure™ Innovation At Every Level for Electricity Companies

EcoStruxure™ Architecture

	Power Generation	Grid Management	Energy Services
Apps, Analytics & Services	**AVEVA Software*** Engineering, Planning & Operations, Asset Performance, Monitoring and Control	**EcoStruxure** Power Advisor, **EcoStruxure** Profit Advisor, **EcoStruxure** Resource Advisor; **EcoStruxure** Augmented Operator Advisor; **EcoStruxure** ADMS; **EcoStruxure** DERMS; **EcoStruxure** ArcFM; **EcoStruxure** Asset Advisor; **EcoStruxure** Smart Metering Advisor	**EcoStruxure** Microgrid Advisor
Edge Control	Modicon Industrial Edge Control for IoT; **EcoStruxure** Hybrid DCS; **EcoStruxure** Foxboro DCS; *SCADA Systems*	**EcoStruxure** Power Monitoring Expert; **EcoStruxure** Substation Operation	**EcoStruxure** Microgrid Operation
Connected Products	**Harmony** Advanced Man-Machine Interface; **Altivar** Innovative & connected Variable Speed Drives; **TeSys** Innovative & connected solutions for motor starters; **PowerLogic** Series Power Quality, Uptime & Efficiency; **Set** Series Comprehensive, robust portfolio of MV Distribution products		

End-to-end Cybersecurity

Cloud and/or On Premise

*The Schneider Electric industrial software business and AVEVA have merged to trade as **AVEVA Group** plc, a UK listed company. The Schneider Electric and Life is On trademarks are owned by Schneider Electric and are being licensed to AVEVA by Schneider Electric.

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EcoStruxure Delivers on 4 Key Integrations

1. Energy + Automation
2. End Point ^ Cloud
3. Design & Build > Operate & Maintain
4. From Site by Site > Integrated facility management

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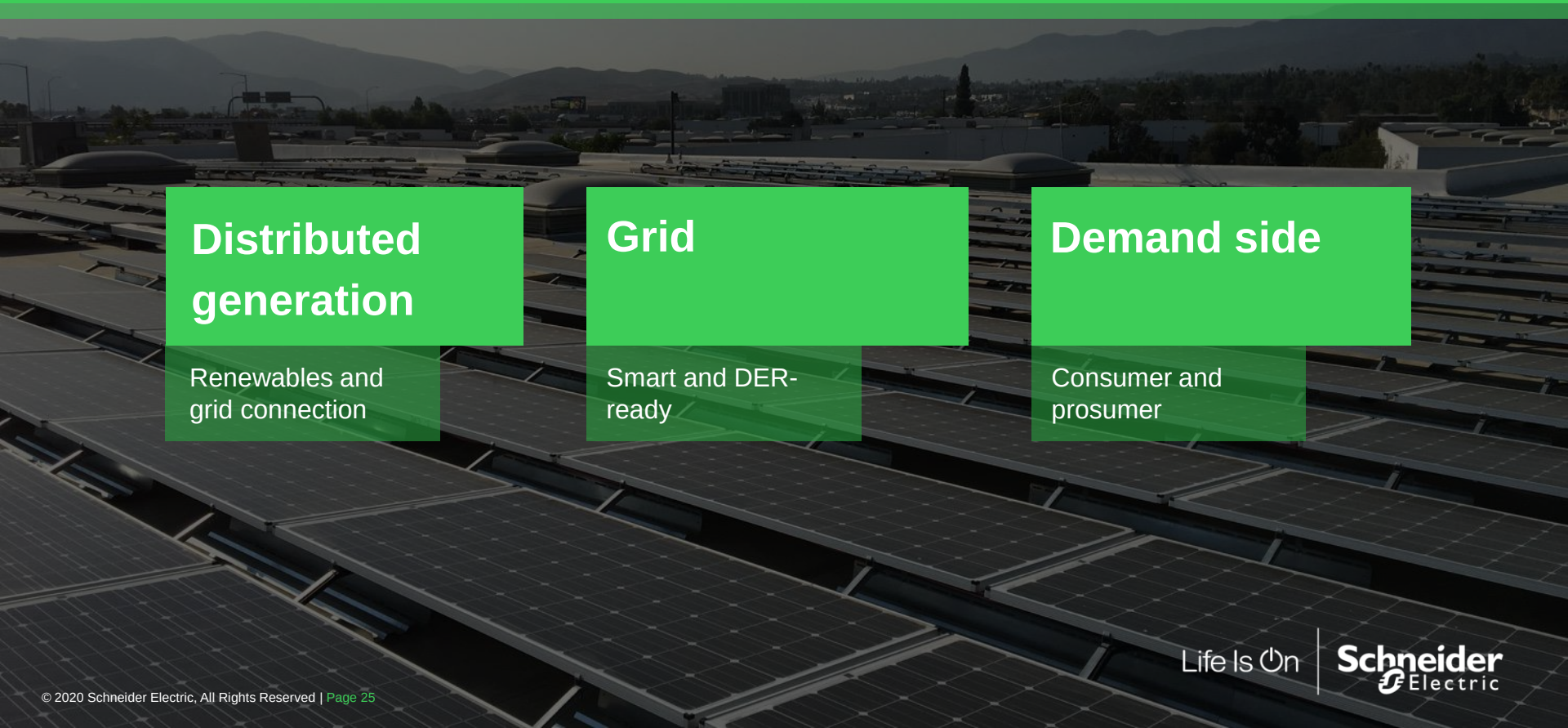
EcoStruxure Delivers on 4 Key Integrations

MV / LV Power distribution leadership and process expertise



Distributed generation

Renewables and grid connection

Grid

Smart and DER-ready

Demand side

Consumer and prosumer

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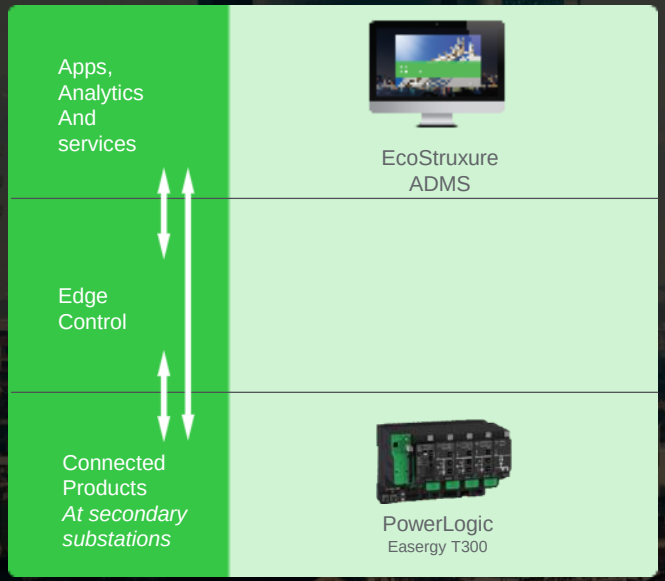
Unareti, Italy

EcoStruxure™ Innovation At Every Level for **Electricity Companies**



Delivering power with more reliablility for the people of Milan and Bruscia and more efficiently for Electricity Companies.

Solution enabling grid awareness, optimized operations, and efficient incident resolution leveraging all data sources and mobility.

10% reduction in SAIDI + renewable energy integration

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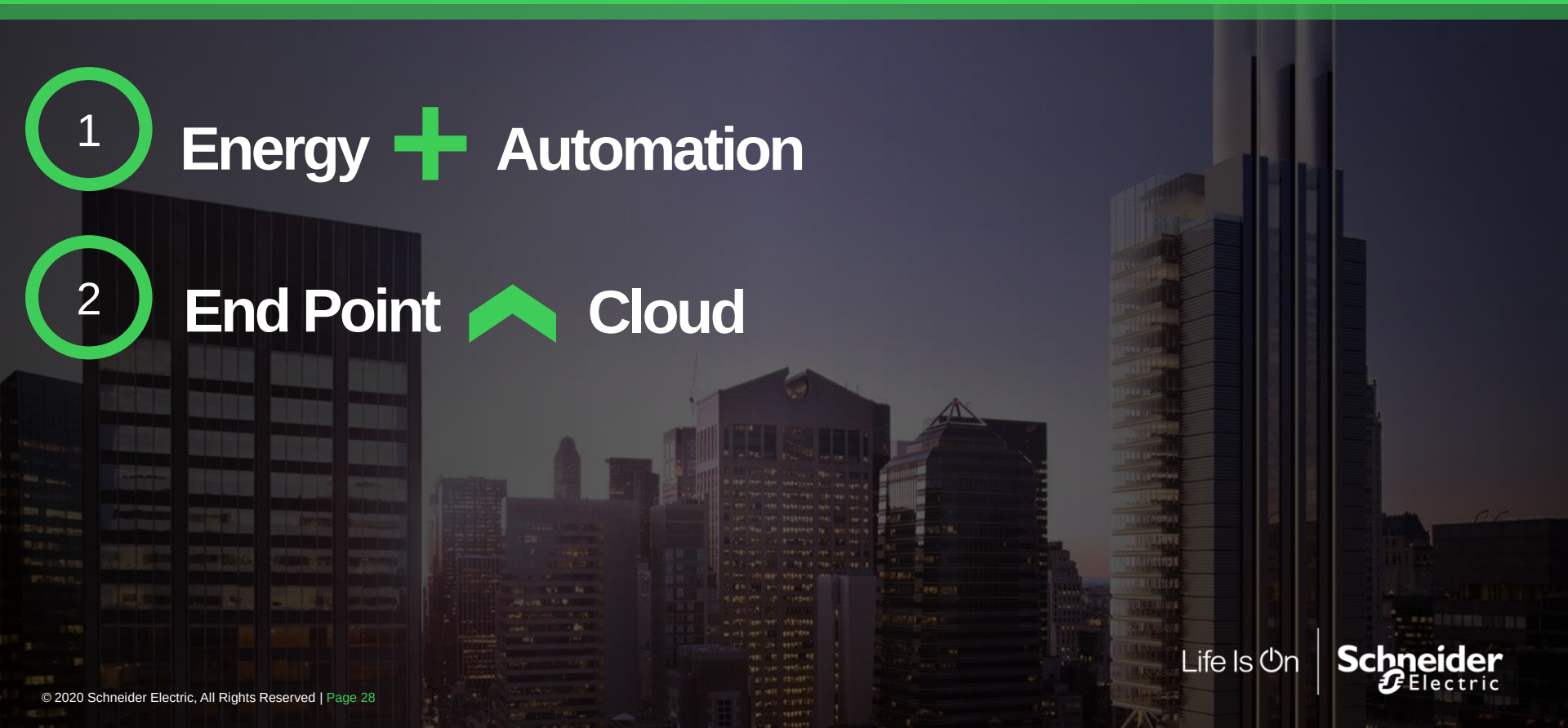
EcoStruxure Delivers on 4 Key Integrations



1 Energy + Automation

2 End Point ^ Cloud

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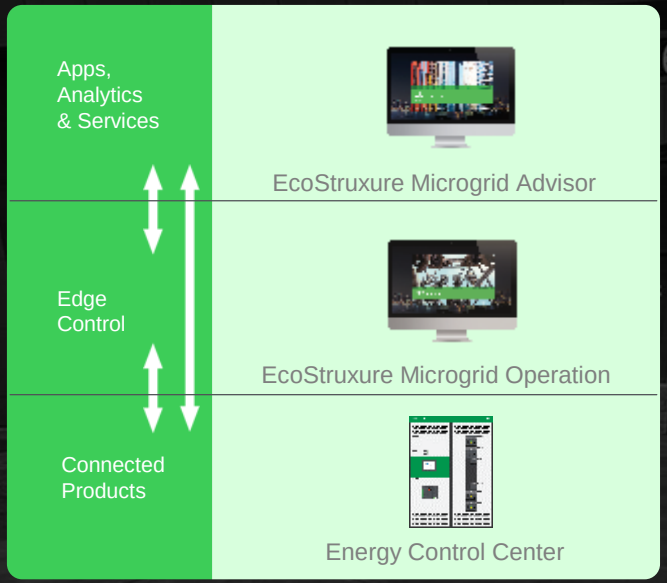
Duke Energy Renewables, US
Innovative Resiliency solution for Public Facilities

EcoStruxure™ Innovation At Every Level for **Electricity Companies**



Microgrid-as-a-Service project at Duke Energy Renewables to improve reliable power supply for Montgomery County Public Safety HQ & Correction Facility.

- Secure resiliency of public services
- Infrastructure upgrade – reduced capex
- Protect critical operations during power outage
- Reduce greenhouse gas and other emissions
- Mitigate risk of escalating energy prices

""We're making significant strides in our key priorities—sustainability, safety and security. Upgrades to critical facilities improve the County's resiliency, so we can keep residents safe and provide needed services even in the event of prolonged power outages."

Isiah Leggett
County Executive, Montgomery County, MD

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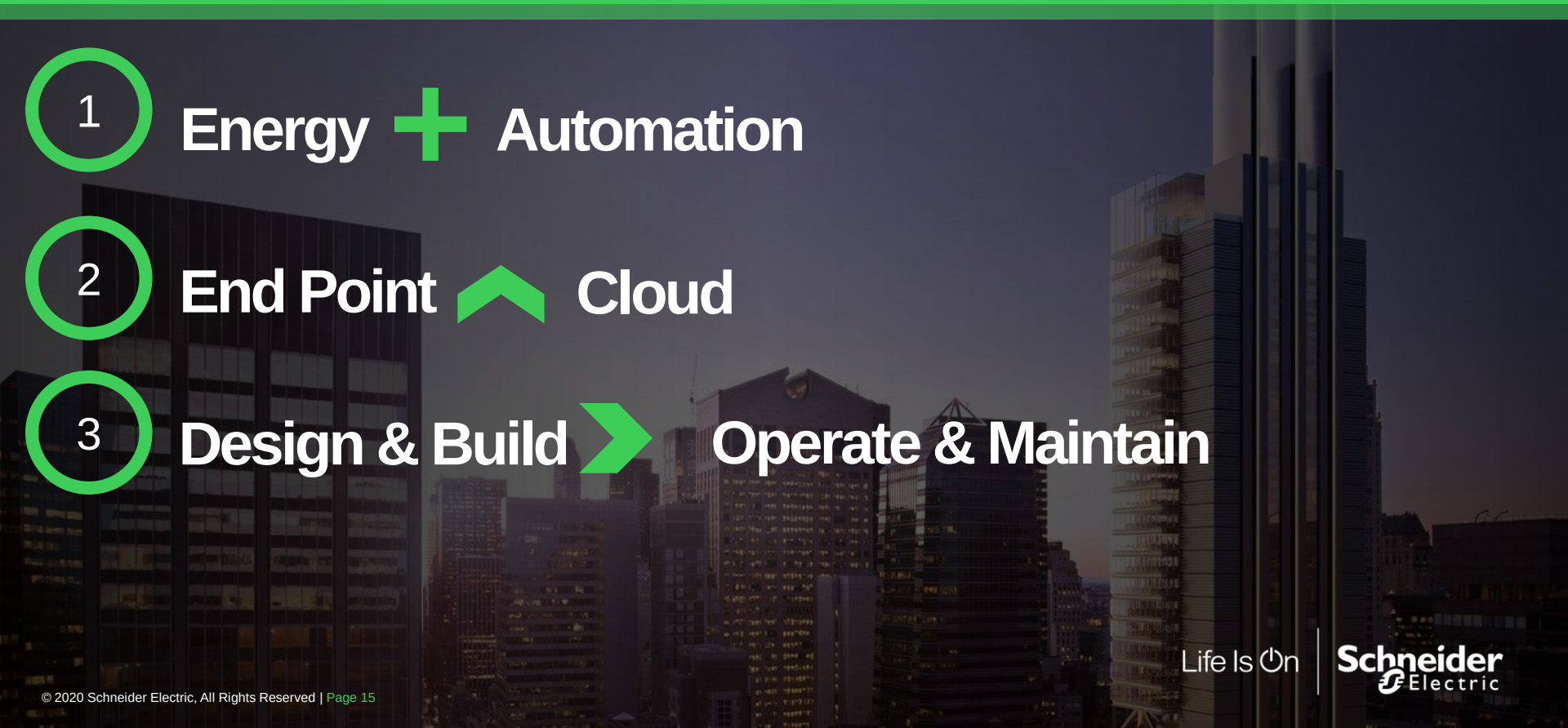
EcoStruxure Delivers on 4 Key Integrations



1. Energy + Automation
2. End Point ^ Cloud
3. Design & Build > Operate & Maintain

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Decarbonization and sustainable Business for Electricity Companies throughout the life cycle

CapEx

OpEx

Project phase

Operation phase

Design

Design is considered a highly competitive differentiator

3D Design, Digital Twin, Laser Scannning integrations, Digital Services ready

Build

Life cycle Information management

Operate

Real-time solution for planning, operation, and analysis of a utility's distribution system

Better decision making for Improved operations and reliability

Maintain

Predictive maintenance to reduce opex costs and optimize maintenance

With **EcoStruxure for Electricity Companies**

Faster and better quality

Reduced delivery time for power plants from **24 to 15 months** with **AVEVA's Integrated Engineering & Design**

No discipline silos

AVEVA NET

Connect Information Together, easily Accessed, Navigated & Reported upon.

Decrease CO_2 emissions

Energy savings **of 4% representing 144GWh** energy saved yearly with **Ecostruxure ADMS** in Italy

Sustainability & Efficiency

$30 million+ avoided outage cost in a single "**Catch of the Year"** with **Predictive Analytics**

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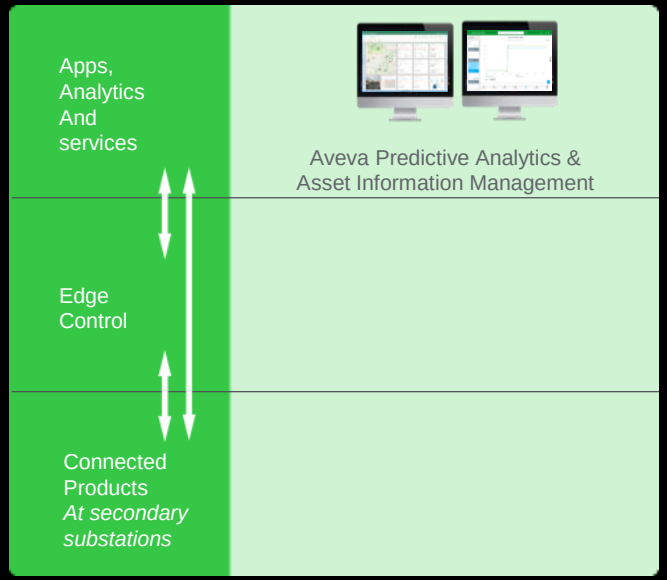
ENEL, Italy

EcoStruxure™ Innovation At Every Level for **Electricity Companies**



Italy's No.1 power company, Europe's 2nd largest in installed generation capacity serving over 61 M customers.

Deployment of Predictive Analytics and Asset Performance Management

- Predictive anomalies detection
- Maintenance strategy optimization and spare part management
- Fault diagnostic & time to failure
- Maintenance process standardization
- Full visibility of maintenance activities
- Fast accessibility to plant engineering twin & assets documentation through a single point of access for remote technical support
- Analysis of market impact of maintenance and decision making support

11,3 M€ savings in 18 months

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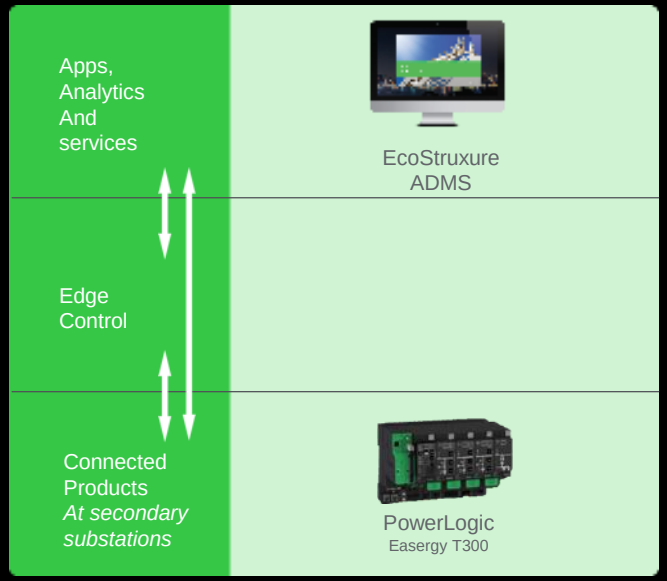
SICAE de la Somme et du Cambresis, France
Scada and ADMS integration

EcoStruxure™ Innovation At Every Level for **Electricity Companies**



1952 km MV/LV Electrical Network
362 millions KWh distributed
29568 residential and business customers
1073 transformer stations

Deployment and Integration of a SCADA and an ADMS for network management with load flow estimation, fault location, two control centers (main + Back-up), OMS and DMS connected to the call center.

Better management of balances between energy supply and demand
Improved cut-off times (criterion B)
120MW of wind farms integrated into the Grid with Advanced Analytics.

Optimized maintenance.

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EcoStruxure Delivers on 4 Key Integrations

1. Energy + Automation
2. End Point ^ Cloud
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4. From Site by Site > Integrated management

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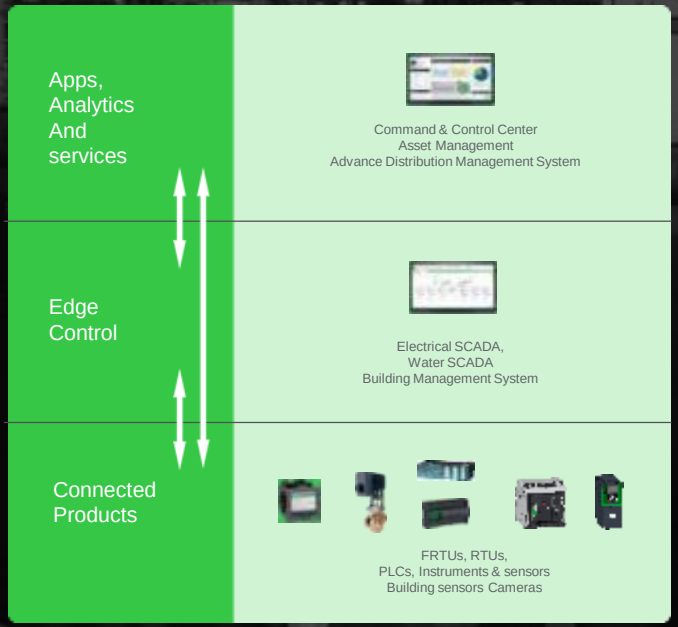
Naya Raipur, India
First integrated smart city in India

EcoStruxure™ Innovation At Every Level for Smart Cities



The first green field Smart City in India with integrated smart city solutions across the city

Integrated Command & Control Center (Wonder ware System Platform) and overall integration with electrical, water, buildings, transportation, surveillance, citizen applications.

Real-time data on operations and maintenance of city infrastructure and services - **Immediate Access to critical KPIs & Reporting data in the Field**

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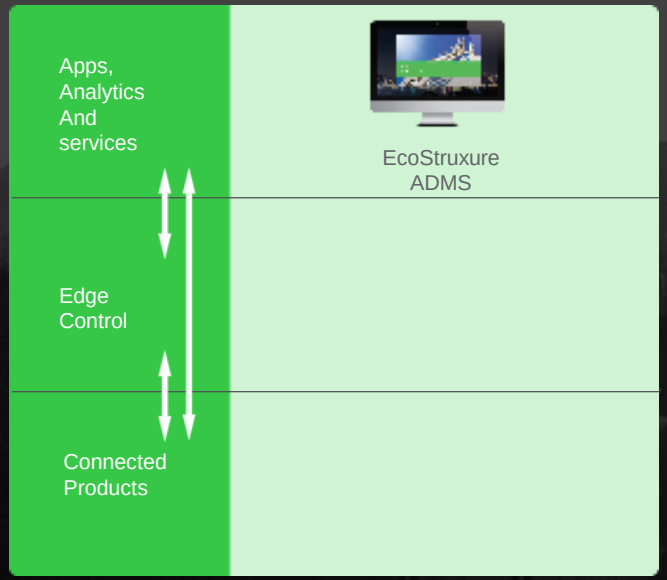
ENEL, Italy
Enhancing Advanced Distribution Management System

EcoStruxure™ Innovation At Every Level for **Electricity Companies**



Italy's No.1 power company, Europe's 2nd largest in installed generation capacity serving over 61 M customers.

Solution delivered complete distribution system visibility, voltage profile optimization, and peak shaving, as well as impact prediction ability for outages and generation and voltage variation.

Energy savings of **4%** representing **144GWh** energy saved yearly

"It is possible to integrate renewable resources and all the benefits of green energy, while increasing the quality of service and the power quality."

ENEL

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Open Collaboration

Network of Partners

20k+
system developers & integrators

3K+
electricity companies

650k
service providers & partners

Strategic Technology Partners

Microsoft
amazon web services
Google
intel
cisco
salesforce
orange
IBM
accenture
Capgemini
Hewlett Packard Enterprise
AutoGrid

Industry Associations

CIRED
IEC
T&D europe
CENELEC
cigre
IEEE
DIGITALEUROPE
eurelectric
orgalim
Wind EUROPE

Open Standards:

Open Tech & Interoperability

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