EcoStruxure™ Grid Operation

Agenda

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- Key features
- Benefits
- High-level Roadmap

4 **Next-Gen SCADA**
- Key features
- Benefits
- High-level Roadmap

5 **Grid Operation Utility Use Cases & Benefits**

6 **Grid Operation Successful Stories (INTERNAL)**

Industry Drivers

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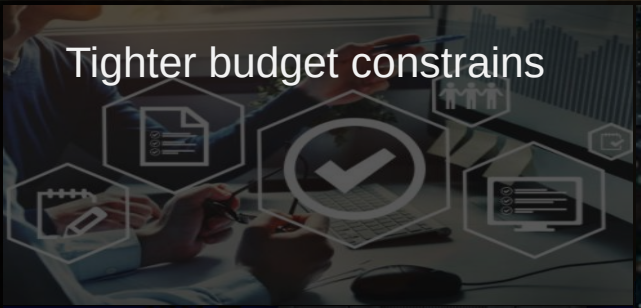
Industry drivers

Tighter budget constrains



Deployment of intelligent (grid automation) devices

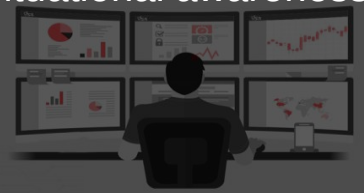
Customer satisfaction

Accurate regulatory reporting

Limited resources

Cybersecurity risks

Situational awareness



Climate impacts

Crew and public safety

Offer Description

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Grid Operations Management Portfolio

Enterprise solutions for the Grids of the Future

ADMS

Realtime and look-ahead operations and planning

DERMS

Optimization of DER to maximize grid flexibility

Grid Operation

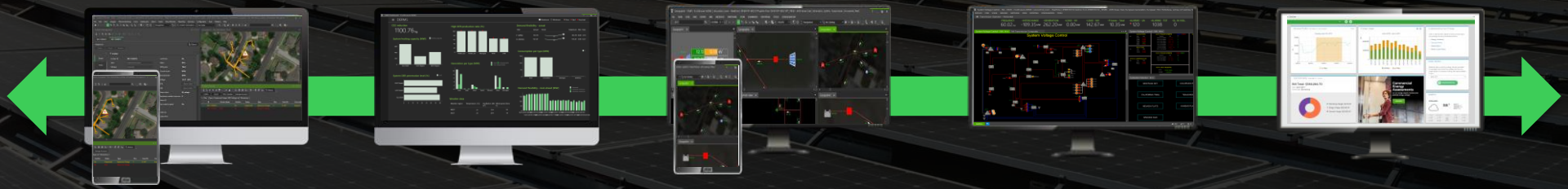
Boosting operational efficiency and reliability & resilience

SCADA/EMS

Security assessment, network analysis & optimization

AGMS

Natural gas grid operations management



State-of-the-art solutions for enabling clean energy transition

Offer Description

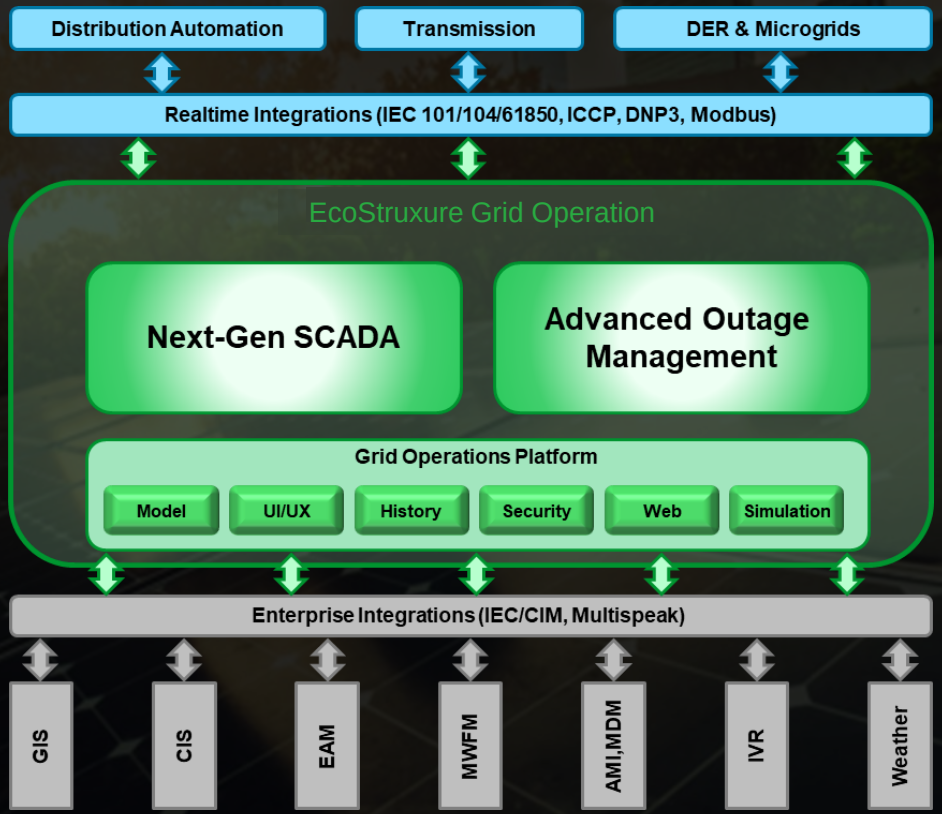
Value-driven, customer-focused, modern deployment approach

For small & small-to-medium utilities who seek ways to maximize **operational efficiency** and improve **reliability & resilience** while reducing investments, **EcoStruxure™ Grid Operation*** is a grid operations solution that provides unique set of integrated tools for managing **grids of the future**.

Unlike other mini-ADMS systems, **EcoStruxure™ Grid Operation** is a scalable and future-proof solution, bringing cutting-edge SCADA and Outage Management technology that will pave the way for best-in-class ADMS in a stepwise approach.

Offer Description

Solution overview



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Offer Description

Flexible deployment

Standalone OMS

Standalone SCADA

SCADA + OMS

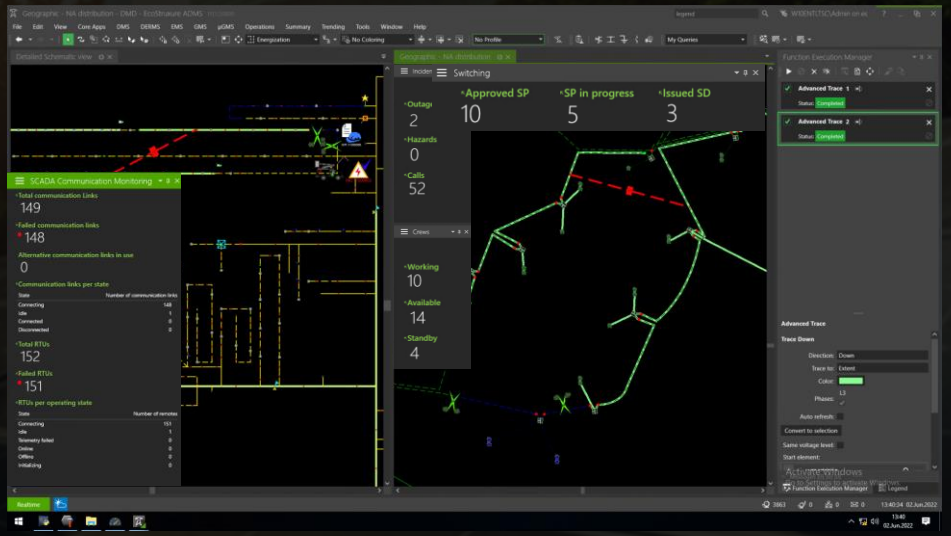
On-prem	✓	✓	✓
On-cloud	✓*		

* **Future option**

Offer Description

Scalable platform

- Common User Interface
- Network Views
  - Geographic, Schematic, Substation, Autogenerated,…
- Real-time Topology
  - Dynamic symbols
- Temporary Elements
- Advanced Tracing
- Summaries
  - Carried by, Abnormal, Event, …
- Trending
- Dashboards
- Native ArcFM GIS integration
  - GDB, UNM



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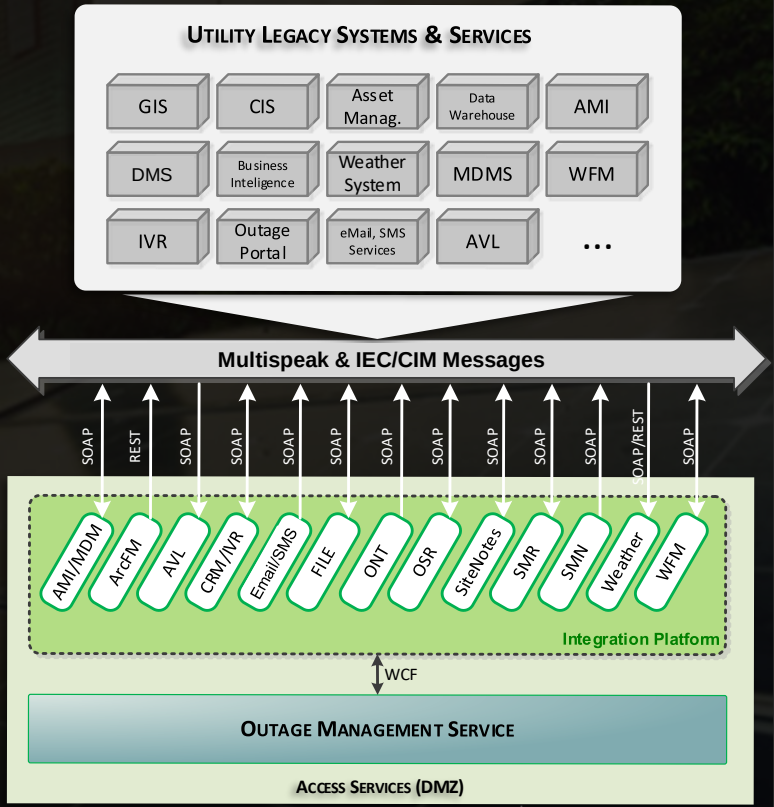
Offer Description

Extensive, standards-based integration capabilities

- Minimize cost and risk
- Secure and reliable data exchange
- Interoperable technologies
- Micro-service like architecture
- Multispeak & IEC/CIM interfaces:
  - AMI/MDM
  - AVL
  - CRM/IVR
  - Proactive Outage Notifications (Email/SMS)
  - Outage Status and Reporting
  - Switching Management Notification and Reporting
  - Workforce Management
  - Weather



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EcoStruxure Grid Operation

Advanced Outage Management – Key Features

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Advanced Outage Management

The most comprehensive outage management

- Faster restoration time with incident management
- Improved visibility of customer complaints with trouble event management
- Safe and efficient end-to-end process with consolidated switching process
- Streamlined process for damage reporting
- Advanced reporting for simplified reliability reports
- Increased safety with as-operated state of the grid with field crew mobile app
- Boosted efficiency and awareness with proactive outage notifications

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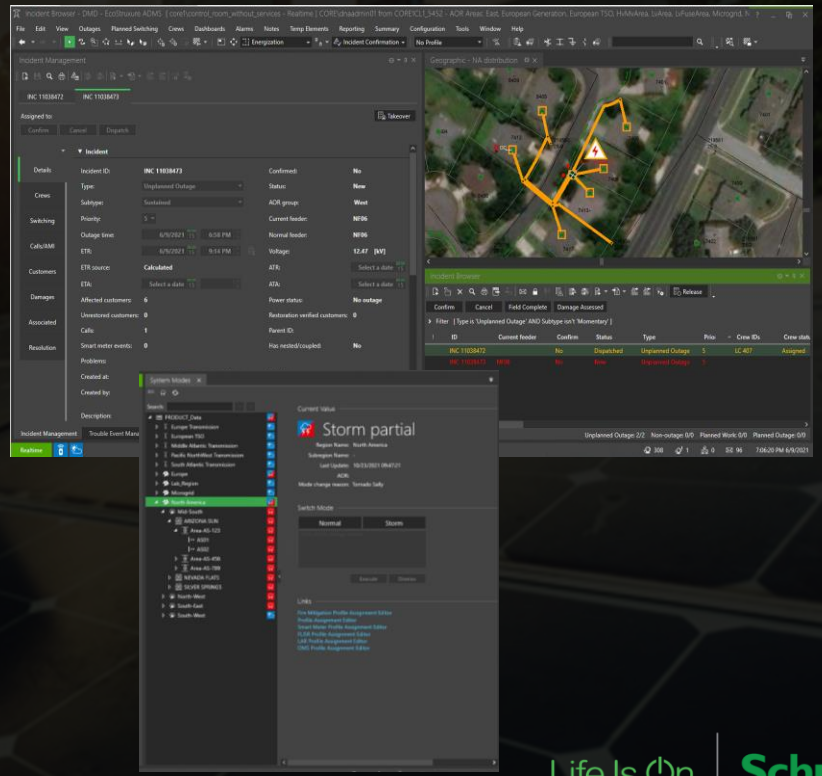
Incident Management

Faster restoration time

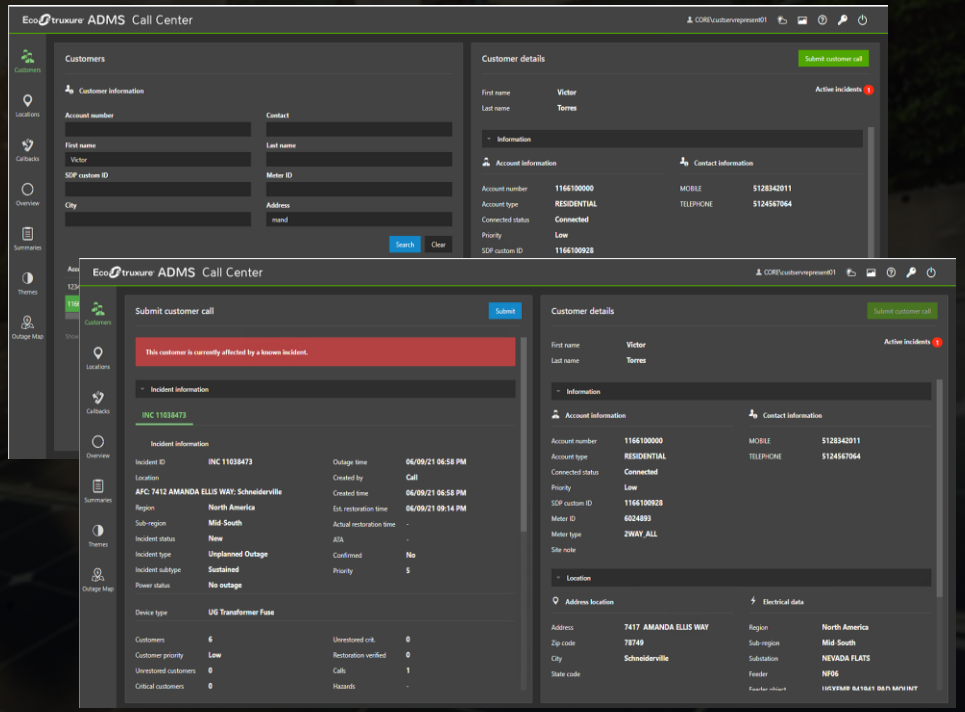
- Industry terms: Incident, Trouble Order, Job, Ticket, etc.
- Incident types:
  - Outage – Unplanned, planned, load shedding, momentary
  - Non-outage – Hazards, Voltage issues
- Versatile configuration options
  - lifecycle, types, visualization, resolution fields, etc.
- Adaptive prediction engine
- Performant storm mode
- Embedded damage handling



Trouble Events Management

Improved visibility of customer complaints & customer satisfaction

- Embedded Web Call center
- Divers call sources
  - IVR
  - Customer portals
  - 3rd party applications
- Standards-based integrations
- Location-based and emergency calls
- Smart meters events and pings
- Automatically created callbacks



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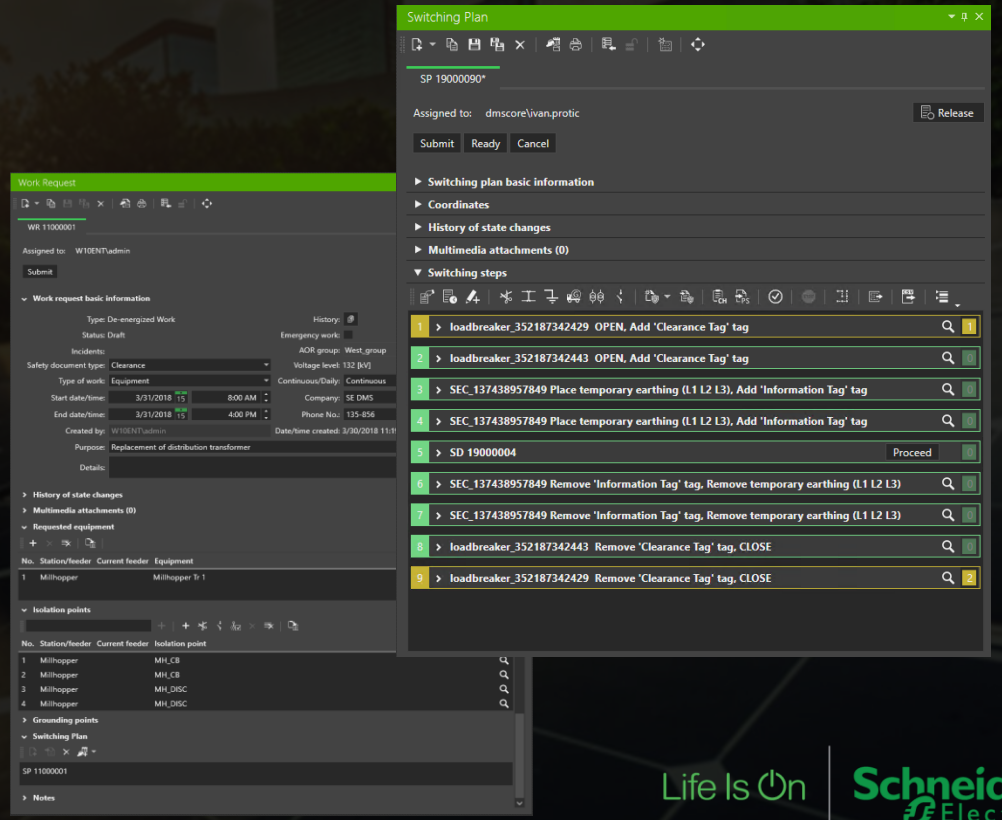
Consolidated Switching

Safe and efficient end-to-end process

- All-inclusive Work Request management
- Adaptable Switching Plans
  - Auto-generated & descriptive steps
  - Automatic validations
  - Single click simulation
- Integrated Safety Document
  - De-energized work
  - Energized work
- Intelligent Gantt chart
- Automated Outage report
  - Timely customer notification



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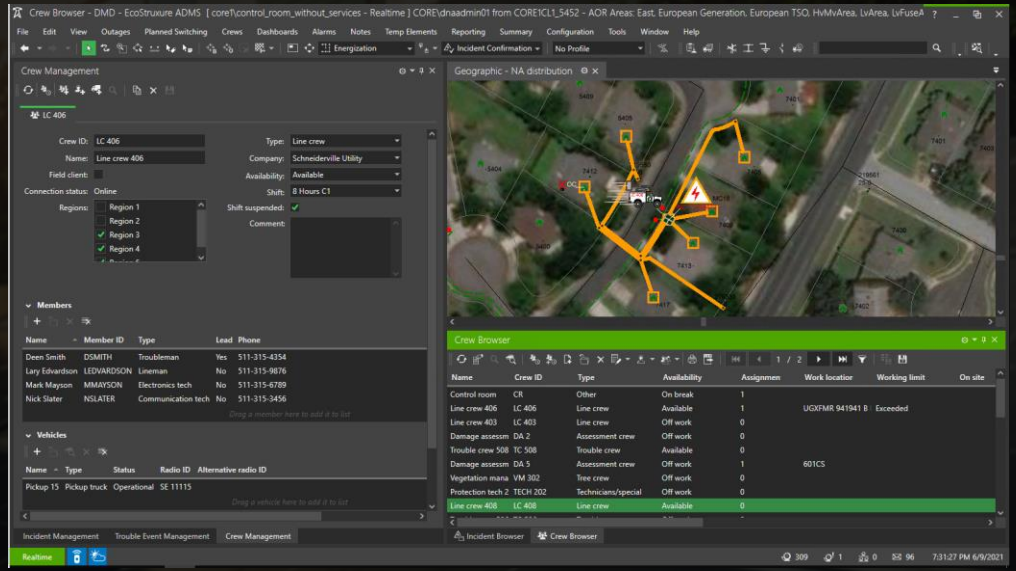
Crew Management

Powerful & versatile

- Comprehensive crew data management
  - Crews
  - Members
  - Vehicles
  - Skills
- Optimal crew dispatching
  - Incidents
  - Switching Plans
- Adaptive, realtime visualization
  - On assignment
  - On location
- Flexible crew shift calendar
  - Simplified resource planning



Advanced Reporting

Simplified creation of reports

- Out-of-the-box standardized reliability reports
- Additional data analytics for:
  - Incident history
  - Calls history
  - Customer interruptions history
  - Reliability analysis
- SQL Server Reporting Service
- Correctable historical data
  - Realtime
  - Study mode

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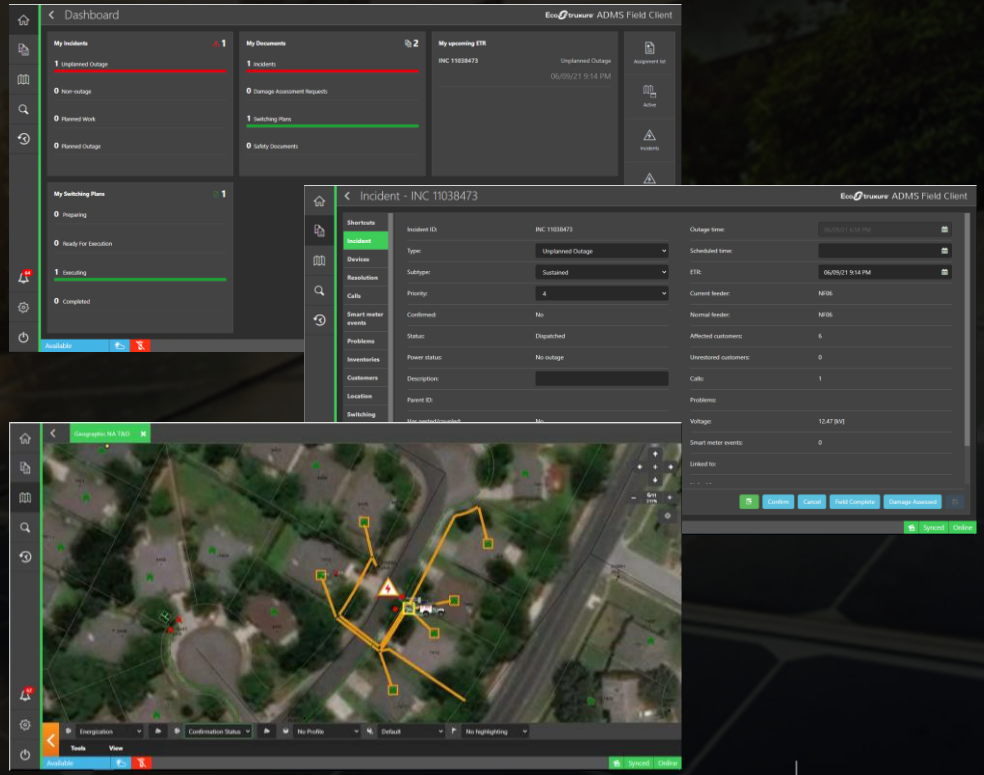
Real-time Field Client

Increased safety with as-operated state

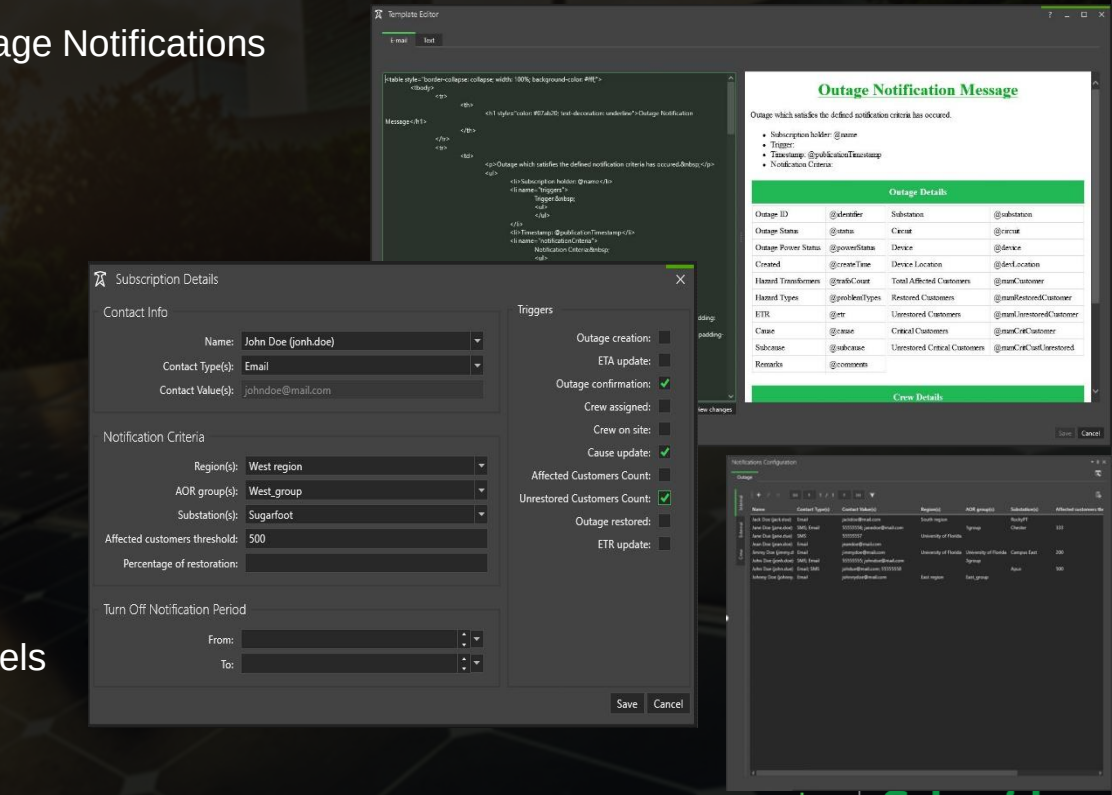
- Web-based client for Field Crews
- Real time topology and awareness
- Improved safety and autonomy
- Online and offline mode
- Decreased control room workload
- Rich & structured assignments management:
  - Incidents
  - Switching plans
  - Outage and work request
  - Damage reporting
  - Ping/Poll meters
  - Access relevant historical data



Proactive Outage Notifications

Keep information-hungry customers well informed all the time

- Advanced, Automated and Adaptive Outage Notifications
- Various persona-based notifications
  - Internal employees
  - External (Customer Service Reps)
  - Crew
- Preference management panel
  - Event triggers
  - Filtering criteria
- Personalized notification templates
  - Email & SMS
- Flexible & secure communication channels
  - Email & SMS



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Advanced Outage Management – Key Benefits

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EcoStruxure Grid Operation

Advanced Outage Management – Key Benefits

Outage Management

Globally field proven, fast restoration, intelligent prediction, comprehensive reporting

Switching Management

Fully digitalized and secure, reduces control room workload and enhances safety & efficiency of field crews

Real-Time Field Client

Single application for managing all types of work, improving crew safety, efficiency & real-time awareness

Proactive Outage Notifications

Keep information-hungry stakeholders well informed all the time, while saving up to 1M€ yearly

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EcoStruxure Grid Operation

Next-Gen SCADA – Key Features

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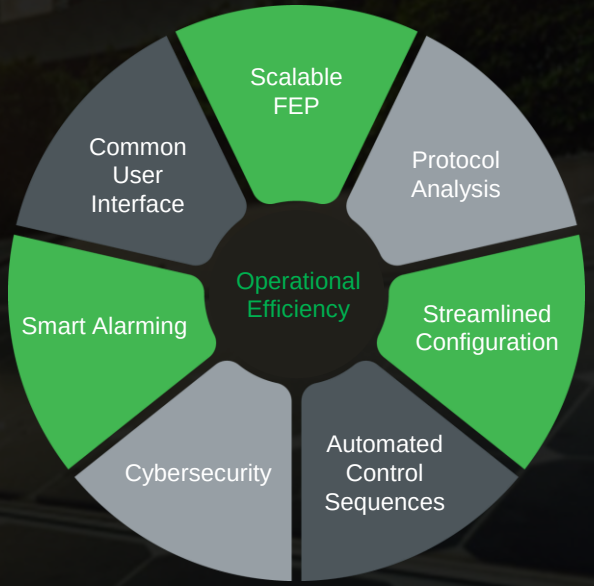
Best-in-class SCADA

Key features

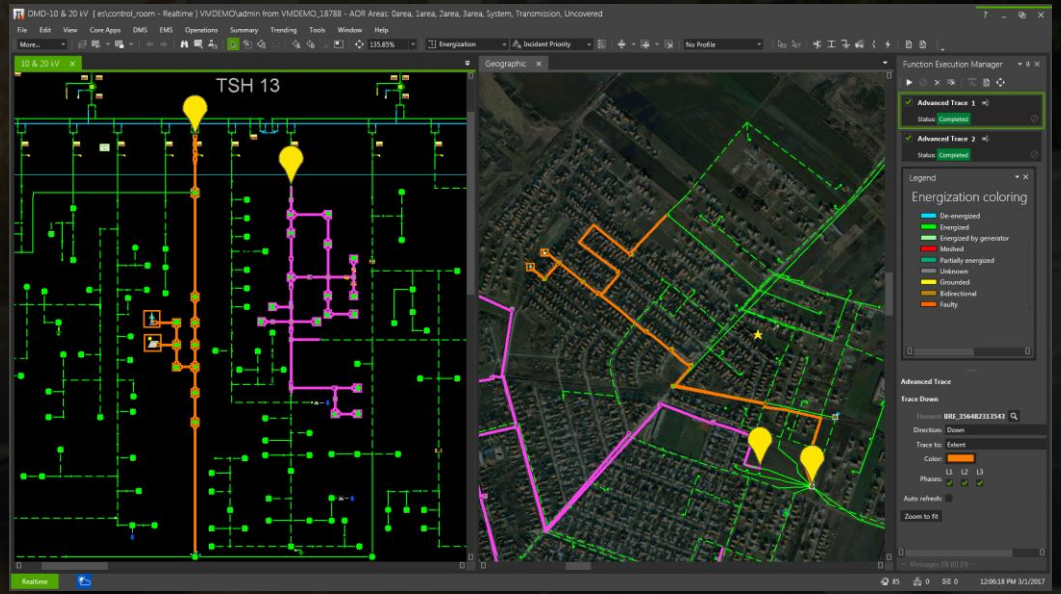
- Common user interface
- Unified network model management and maintenance
- High performance for large number of points
- Scalable Front-End Processing (FEP)
- Rich communication protocols portfolio
- Powerful communication troubleshooting tools
- Cyber Security – IEC 62351 standard series
- Smart alarming



Common User Interface

Truly Single Pane of Glass

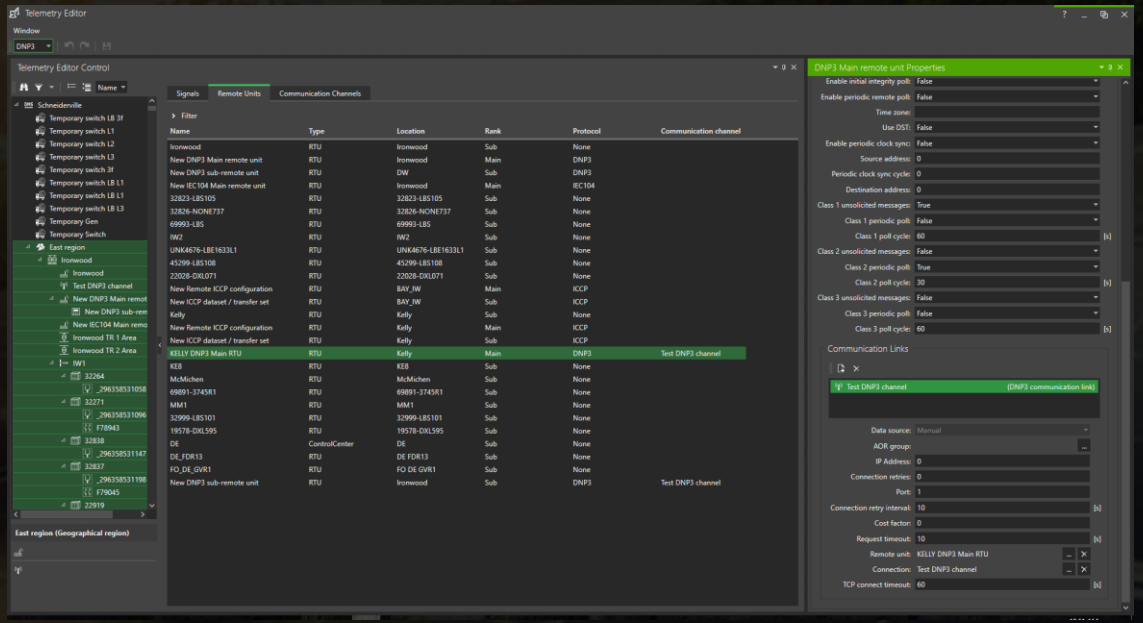
- Single solution for monitoring, commanding, alarming, tagging
- intuitive navigation within substation, schematic and geographic displays
- Aerial photo and landbase information
- Integrated search



Streamlined Configuration

Configure, validate and test SCADA data in a safe and efficient way

- Incremental changes of SCADA configuration
- Powerful engine for testing, validation and promotion
- Online changes without downtime
- Templatized configuration



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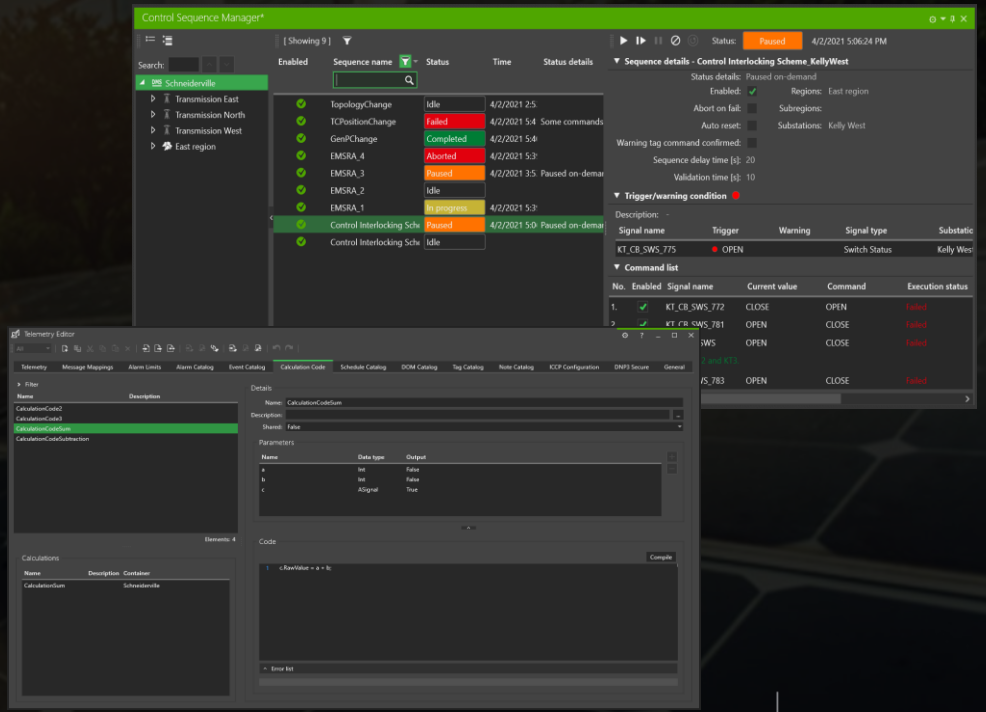
Automated Control Sequences & Calculations

Avoid unsafe, repetitive & error-prone operations

- Automated Control Sequences
  - Create and execute advanced control and automation schemes
  - On demand and condition-based execution
  - Define exit criteria
  - In depth sequence execution monitoring

- Generic Calculation Engine
  - Points calculation based on static and dynamic model
  - Simple drag & drop from display to the calculation
  - Time/event driven execution
  - Generate alarms, placing tags, issue commands towards RTUs, etc.



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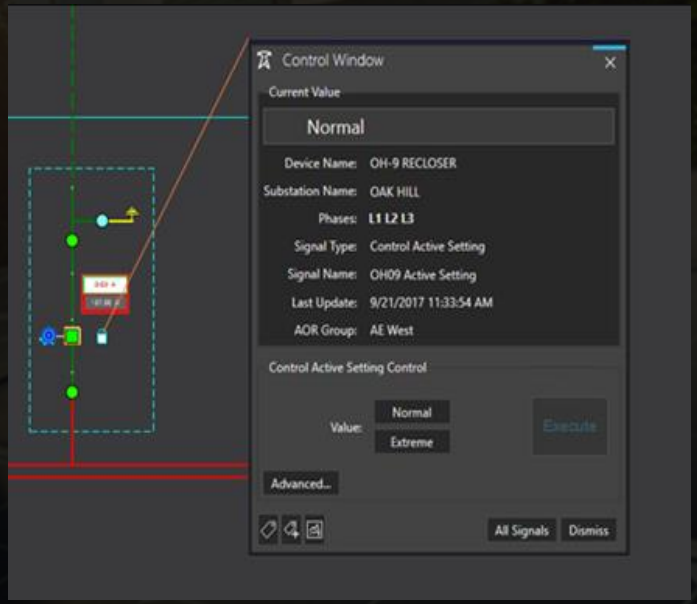
IEC 61850

First ever to speak natively via IEC 61850

- Harmonized communication with IEDs*
  - Direct/indirect access
  - Data acquisition
  - Supervisory control
  - Communication
  - Troubleshooting
  - IEC 62351 compliant
- Streamlined configuration
- Simplified testing
- Reduced costs
  - No protocol converters
  - Less wiring



* IED – Intelligent Electronic Device

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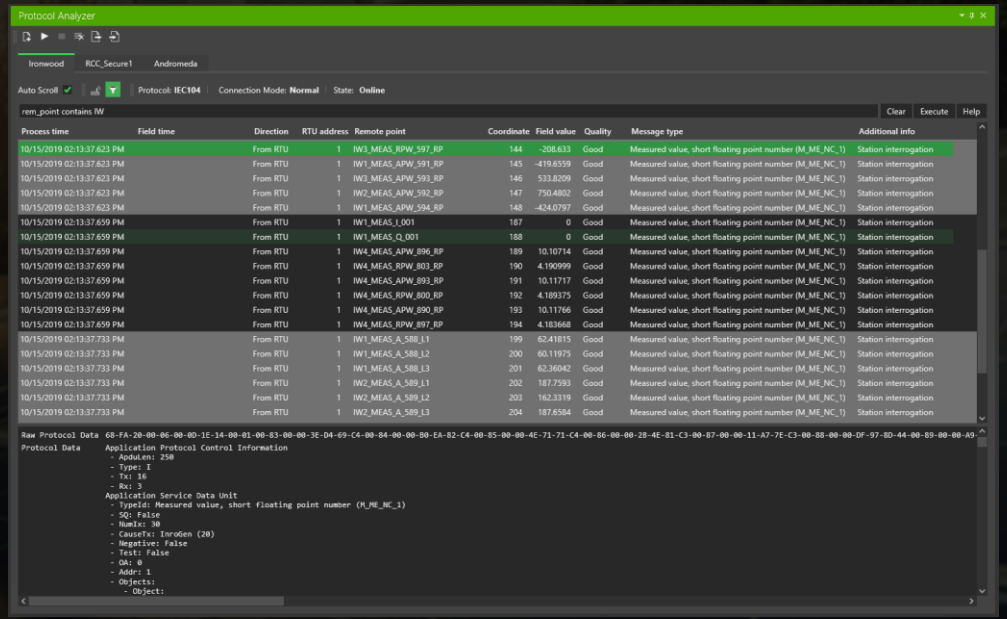
Off-the-shelf Protocol Analyzer

Comfortable and fast troubleshooting

- Real-time & offline analysis
- Available directly from the workstation
- Improved cybersecurity
- Network model-aware navigation
- Raw & human readable protocol traffic
- Powerful filtering
- Encrypted packages analysis



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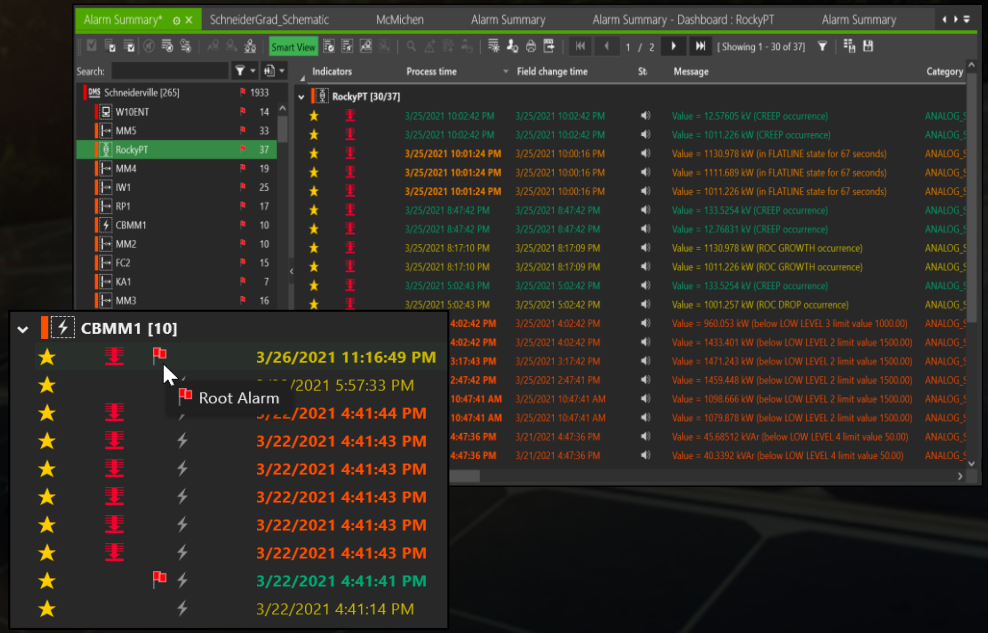
Smart Alarming

Very advanced level of managing alarms

- Network topology-based alarm management
- Intelligent alarm grouping
  - Dynamic topological organization
  - Static network model relations
  - Alarm classification
  - Alarm category semantics
- Root cause suggestion
- Augmented situational awareness
- Alarm noise cancelation
  - Better focus and prompt reaction



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EcoStruxure Grid Operation

Next-Gen SCADA – Key Benefits

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EcoStruxure Grid Operation - Next-gen SCADA

Key benefits

Data Commissioning

Significant savings in SCADA telemetry commissioning with the use of RTU templates and IEC 61850

Performance

100k changes/sec processed during high activity scenarios

Protocol Analyzer

Save time needed for analysis of SCADA communication issues up to 70%

TCO

Reduce total cost of ownership by utilizing single network model for all voltage levels and all grid configurations

Utility Use Cases & Benefits

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Grid Operation

Utility use cases

Foundation

- Digital twin creation & maintenance
- Seamless integration with other systems
- System administration
- Monitoring and observing the distribution grid
- Tracking system KPI
- Utilizing historical data
- Locating elements of interest

Operational Efficiency

- SCADA Commissioning
- SCADA Troubleshooting
- Operating the distribution network
- Improving Cybersecurity
- Situational awareness and critical situation handling with smart alarming

Reliability & Resilience

- Planned work and outage management
- Unplanned outage management
- Trouble event management
- Damage Assessment
- Crew management
- Field Operations
- Storm management
- Operational and performance Reporting

Grid Operation

Key benefits

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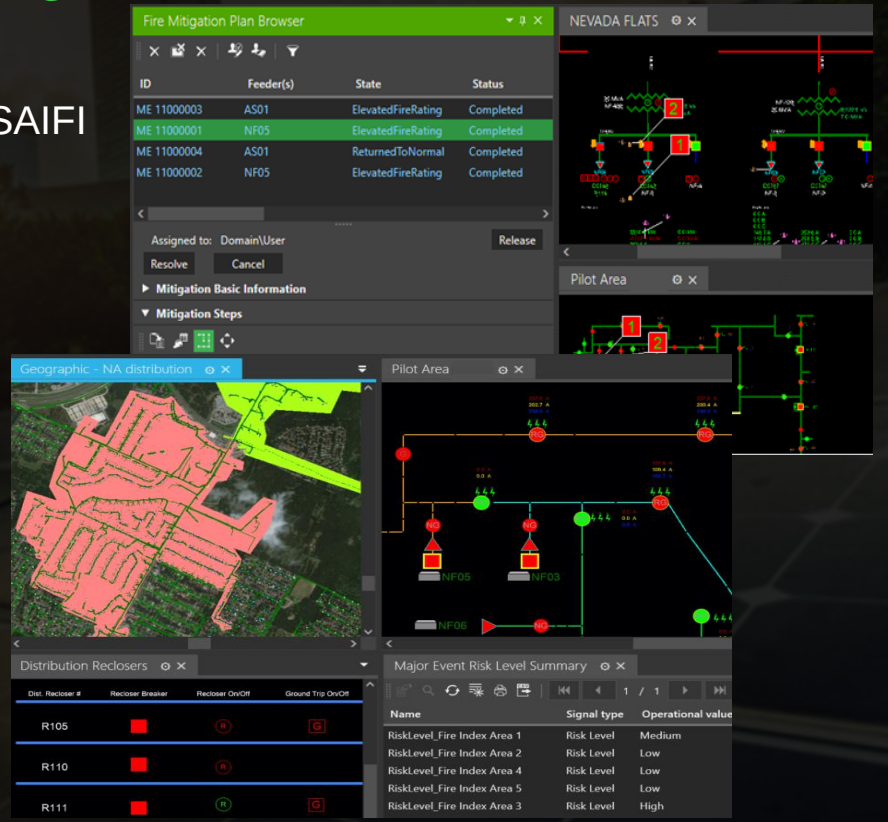
Addons

EcoStruxure ADMS - Outage Management

Fire Mitigation

- Reduces fire risks with minimum impact on SAIDI/SAIFI
- During the periods of elevated fire risk, identifies protection/switching operations
- Visualization of geo-areas on electrical network in accordance with weather conditions
- Operations based on as-operated state
  - Manual, advisory/semi-automatic, automatic modes



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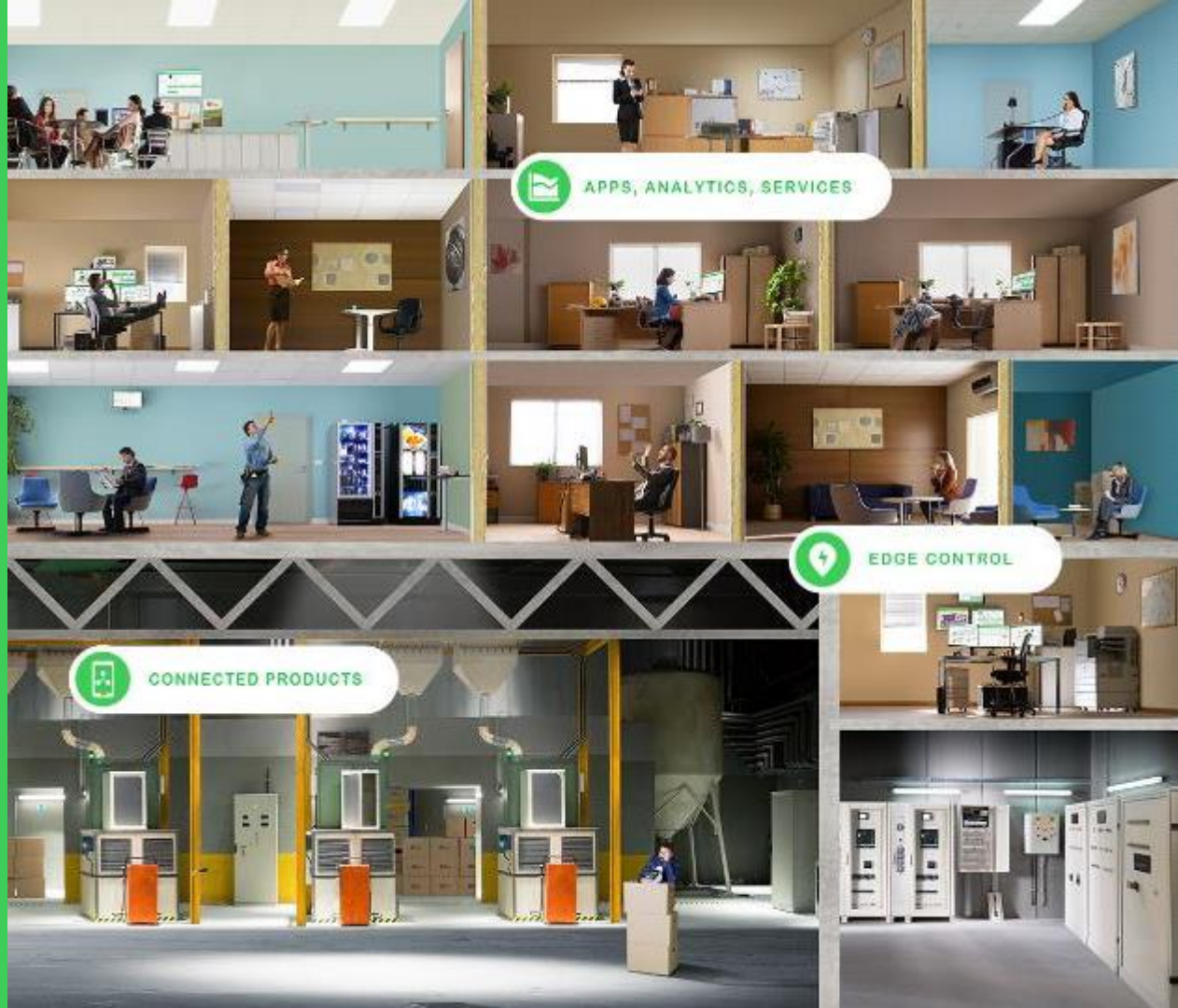
EcoStruxure™

Innovation At Every Level



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