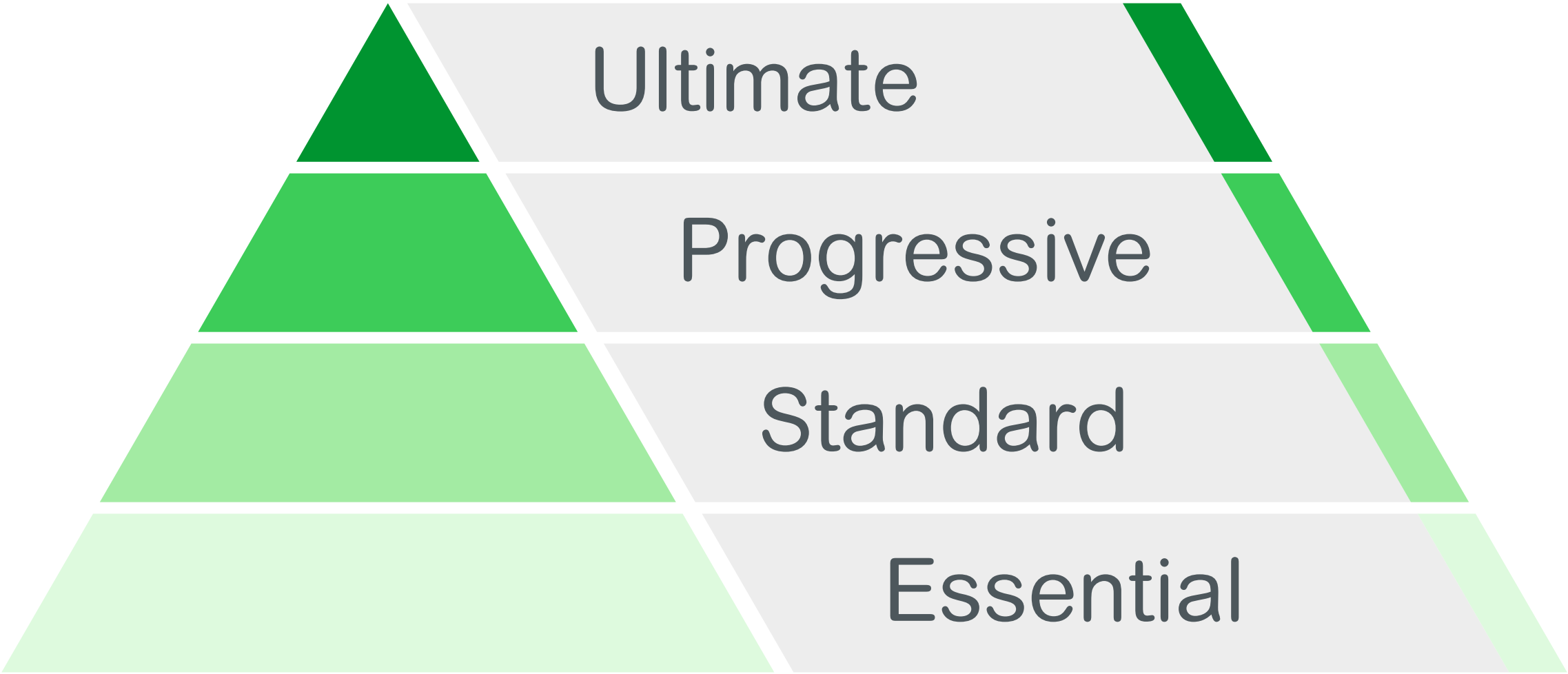# Clean energy for sustainable future

Great efforts are being invested all over the world towards the promotion of clean energy and environmental protection. Digital transformation of the power grid to boost clean energy puts the smart grid industry to the test. New types of energy sources, their distributed location, load and generation volatility, demand pattern changes, energy policies change, new reliability requirements, increasing end customers expectations, and the evolving revenue models on the business side, are all new challenges utilities face today.

To cope with these tremendous changes, distribution utilities need to take an active role in managing their systems and adapt to varying conditions in real-time. Only a comprehensive set of specialized software tools integrated into a robust solution can handle these challenges and ensure a smooth transition – from traditional, paper-driven processes to a digital and adaptive way of managing grids in real time. Utilities of the future require a complete understanding of actual and future network states that would enable them to respond to known and unexpected events safely and efficiently. These capabilities are now offered through an Advanced Distribution Management System (ADMS).

Stepwise approach to sustainability

Schneider Electric's EcoStruxure™ ADMS helps utilities tailor their path by gradually tackling individual challenges with a stepwise deployment approach, depending on their digital maturity and strategic business goals. Essential and Standard offers address the primary use cases, while Progressive and Ultimate offers address more challenging ones. Schneider Electric's four pillars of the ADMS enable greater sustainability by confronting today's techno-social and climate changes:

1. **Operation Efficiency**
2. **Reliability & Resilience**
3. **Grid Efficiency**
4. **Grid Flexibility**

Ultimate

Progressive

Standard

Essential

Operational Efficiency

Clean energy for sustainable future | Stepwise approach to sustainability | Operational Efficiency | Reliability & Resilience | Grid Efficiency | Grid Flexibility | Partnership for the future

Operational Efficiency

Drivers and solution

Improving operations is a continuous initiative and combined effort to optimize processes, people, finances, and technology. The real indicators of enhanced operational efficiency are intelligent asset allocation, higher utilization rates, the culture of safety, and a myriad of other factors.

Schneider Electric EcoStruxure™ ADMS offers a new and improved solutions that will ensure success and future sustainability for cost effective, comprehensive and modern management of grid and field operations with a higher degree of digitalization.

Flexible & Scalable Platform

Remote Web Client

Next-Gen SCADA

Operational Efficiency

Real-time Field Client

Templated Model Management

Advanced Switching Management

Clean energy for sustainable future

Stepwise approach to sustainability

Operational Efficiency

Reliability & Resilience

Grid Efficiency

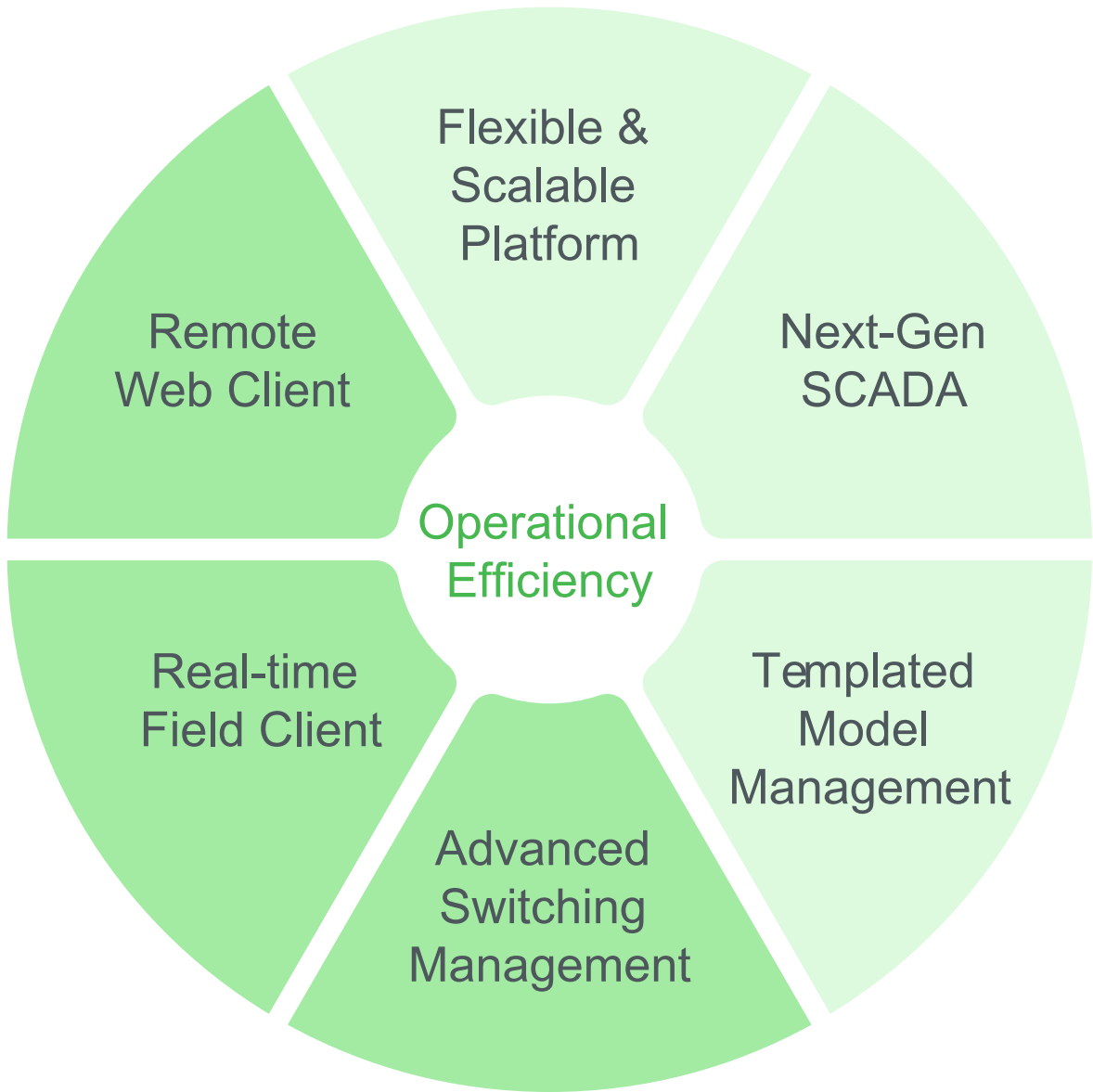Grid Flexibility

Partnership for the future

Operational Efficiency

Offers

ESSENTIAL	STANDARD	PROGRESSIVE	ULTIMATE
✓ Grid Operations Platform ✓ Next-Gen SCADA ✓ Single Pane of Glass HMI ✓ Templated Model Management ✓ Load Shedding ✓ Volt Var Optimization (CVR) ✓ ICCP ✓ DNP3 ✓ IEC 101 ✓ IEC 104 Advanced Switching Management Field Client WebDMD Forecast (NT, ST, MT) Big Data Connector LV Network Model IEC 61850	✓ Grid Operations Platform ✓ Next-Gen SCADA ✓ Single Pane of Glass HMI ✓ Templated Model Management ✓ Load Shedding ✓ Volt Var Optimization (CVR) ✓ ICCP ✓ DNP3 ✓ IEC 101 ✓ IEC 104 ✓ Advanced Switching Management ✓ Field Client ✓ WebDMD ✓ Forecast (NT, ST, MT) Big Data Connector LV Network Model IEC 61850	✓ Grid Operations Platform ✓ Next-Gen SCADA ✓ Single Pane of Glass HMI ✓ Templated Model Management ✓ Load Shedding ✓ Volt Var Optimization (CVR) ✓ ICCP ✓ DNP3 ✓ IEC 101 ✓ IEC 104 ✓ Advanced Switching Management ✓ Field Client ✓ WebDMD ✓ Forecast (NT, ST, MT) ✓ Big Data Connector ✓ LV Network Model IEC 61850	✓ Grid Operations Platform ✓ Next-Gen SCADA ✓ Single Pane of Glass HMI ✓ Templated Model Management ✓ Load Shedding ✓ Volt Var Optimization (CVR) ✓ ICCP ✓ DNP3 ✓ IEC 101 ✓ IEC 104 ✓ Advanced Switching Management ✓ Field Client ✓ WebDMD ✓ Forecast (NT, ST, MT) ✓ Big Data Connector ✓ LV Network Model ✓ IEC 61850
Available addons ArcFM Data Exporter OSIsoft PI Historian Integration Conitel, DNP3 Slave, IEC 101 Slave, MD3, MODBUS, Series 5, VANCOMM	**Available addons** Switching Management Reporting Integration	**Available addons** Switching Management Notification Integration	

| Clean energy for sustainable future | Stepwise approach to sustainability | Operational Efficiency | Reliability & Resilience | Grid Efficiency | Grid Flexibility | Partnership for the future |

Operational Efficiency

Benefits

Reduce total cost of ownership by utilizing single network model for all voltage levels (HV/MV/LV) and all grid configurations, suitable for all geographies

Improve crew safety, along with productivity by 60% using the advanced switching management and real-time field client

Up to 5 times faster systems integration by using baseline, standards-based (IEC 61968 compliant) interfaces

Ensure savings of at least **250k engineer/analyst hours over** a 10-year period for SCADA telemetry commissioning in large-scale systems (with 25k RTUs and more)

Protocol Analyzer **saves the time** needed for the analysis of SCADA communication issues up to **70%**, compared to the traditional troubleshooting approach

Minimize the time needed for systems' maintenance with **automated deployment and testing** tools

Clean energy for sustainable future | Stepwise approach to sustainability | Operational Efficiency | Reliability & Resilience | Grid Efficiency | Grid Flexibility | Partnership for the future

Reliability & Resilience

Clean energy for sustainable future

Stepwise approach to sustainability

Operational Efficiency

Reliability & Resilience

Grid Efficiency

Grid Flexibility

Partnership for the future

Reliability & Resilience

Drivers and solution

Climate change already has noticeable effects on the world. Due to these effects, utilities cope with lower reliability, higher expenses, and more power outages. Many utilities are not ready because the current infrastructure is built for historical weather conditions and are more vulnerable to future extremes. Utilities strive for an improved response time to outages and the ability to anticipate incidents in order to improve customer service and ensure consistent power quality by greater grid automation. The system must be ready to mitigate major events, maintain energy flow and ensure the grid's digital and physical security. The goal is to move from reactive to preventive operations & maintenance.

Schneider Electric EcoStruxure™ ADMS provides several layers through which utilities can increase their Reliability and Resilience, respond to severe weather events across the world, improve their reaction time to outages, anticipate and mitigate major events – and all that for even better customer service.

Advanced Outage Management

Advanced Switching Management

Real-time Field Client

AAA Outage Notifications

FLISR

Automatic FLISR

Major Event Mitigation

Reliability and Resilience

Clean energy for sustainable future

Stepwise approach to sustainability

Operational Efficiency

Reliability & Resilience

Grid Efficiency

Grid Flexibility

Partnership for the future

Reliability & Resilience

Offers

ESSENTIAL	STANDARD	PROGRESSIVE	ULTIMATE
✓ Advanced Outage Management	✓ Advanced Outage Management	✓ Advanced Outage Management	✓ Advanced Outage Management
✓ Single Pane of Glass HMI	✓ Single Pane of Glass HMI	✓ Single Pane of Glass HMI	✓ Single Pane of Glass HMI
✓ Templated Model Management	✓ Templated Model Management	✓ Templated Model Management	✓ Templated Model Management
✓ ICCP	✓ ICCP	✓ ICCP	✓ ICCP
Advanced Switching Management	✓ Advanced Switching Management	✓ Advanced Switching Management	✓ Advanced Switching Management
Real-time Field Client	✓ Real-time Field Client	✓ Real-time Field Client	✓ Real-time Field Client
Web Control Center (WebCC)	✓ Web Control Center (WebCC)	✓ Web Control Center (WebCC)	✓ Web Control Center (WebCC)
WebDMD	✓ WebDMD	✓ WebDMD	✓ WebDMD
CRM & IVR Integration	✓ CRM & IVR Integration	✓ CRM & IVR Integration	✓ CRM & IVR Integration
AMI Integration	✓ AMI Integration	✓ AMI Integration	✓ AMI Integration
Outage Status & Reporting Integration	✓ Outage Status & Reporting Integration	✓ Outage Status & Reporting Integration	✓ Outage Status & Reporting Integration
AVL Integration	✓ AVL Integration	✓ AVL Integration	✓ AVL Integration
FLISR	FLISR	✓ FLISR	✓ FLISR
AAA Outage Notifications	AAA Outage Notifications	✓ AAA Outage Notifications	✓ AAA Outage Notifications
Fire Mitigation	Fire Mitigation	✓ Fire Mitigation	✓ Fire Mitigation
LV Network Model Visibility	LV Network Model Visibility	✓ LV Network Model Visibility	✓ LV Network Model Visibility
Outage Portal Integration	Outage Portal Integration	✓ Outage Portal Integration	✓ Outage Portal Integration
Workforce Management Integration	Workforce Management Integration	Workforce Management Integration	✓ Workforce Management Integration
Automatic FLISR	Automatic FLISR	Automatic FLISR	✓ Automatic FLISR
Automatic Fire Mitigation	Automatic Fire Mitigation	Automatic Fire Mitigation	✓ Automatic Fire Mitigation
Available addons	**Available addons**	**Available addons**	
ArcFM Data Exporter	Site Notes Integration	Switching Management Integrations	

Clean energy for sustainable future | Stepwise approach to sustainability | Operational Efficiency | Reliability & Resilience | Grid Efficiency | Grid Flexibility | Partnership for the future

Reliability & Resilience

Key Benefits

Improve Decision Making by encompassing embedded outage management and major event mitigation intelligence

Achieve electric reliability index **greater than 99%** with help of advanced outage management capabilities.

"To be able to restore power to the majority of customers on a feeder in under a minute is something that has never been done in the history of SA Power Networks. Without Schneider, we probably would not have progressed as far as we have and as quickly as we have."

Tasnim Abdel-Razar, Network Control Manager
SA Power Networks

Ensure prompt response to a disturbance and swift implementation of necessary actions to minimize the overall outage duration

Keep information-hungry stakeholders well informed all the time, while saving up to 1M€ yearly using advanced, automated and adaptive outage notifications

Estimated savings of EcoStruxure ADMS FLISR implementation for a utility with **2.5M customers** are up to **30m€ per year**

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Grid Efficiency

Clean energy for sustainable future

Stepwise approach to sustainability

Operational Efficiency

Reliability & Resilience

Grid Efficiency

Grid Flexibility

Partnership for the future

Grid Efficiency

Drivers and solution

Energy efficiency is a superior measure that a utility employs to ensure customer satisfaction by providing reliable and quality power delivery while keeping the electricity tariffs affordable. A kilowatt saved is worth more than a kilowatt supplied. This is because a utility avoids transmission and distribution infrastructure costs and line losses as well as the reserve capacity needed to assure reliable service. By avoiding CO_2 emissions direct environmental benefits crucial for fighting climate change are also generated.

Schneider Electric EcoStruxure™ ADMS delivers a portfolio of state-of-the-art apps that provide full real-time observability of the entire network and insight into the forecasted network state, enabling holistic system analysis and optimization, as well as powerful what-if and planning studies.

Monitoring

Planning

Forecast

Grid
Efficiency

Optimization

Analysis
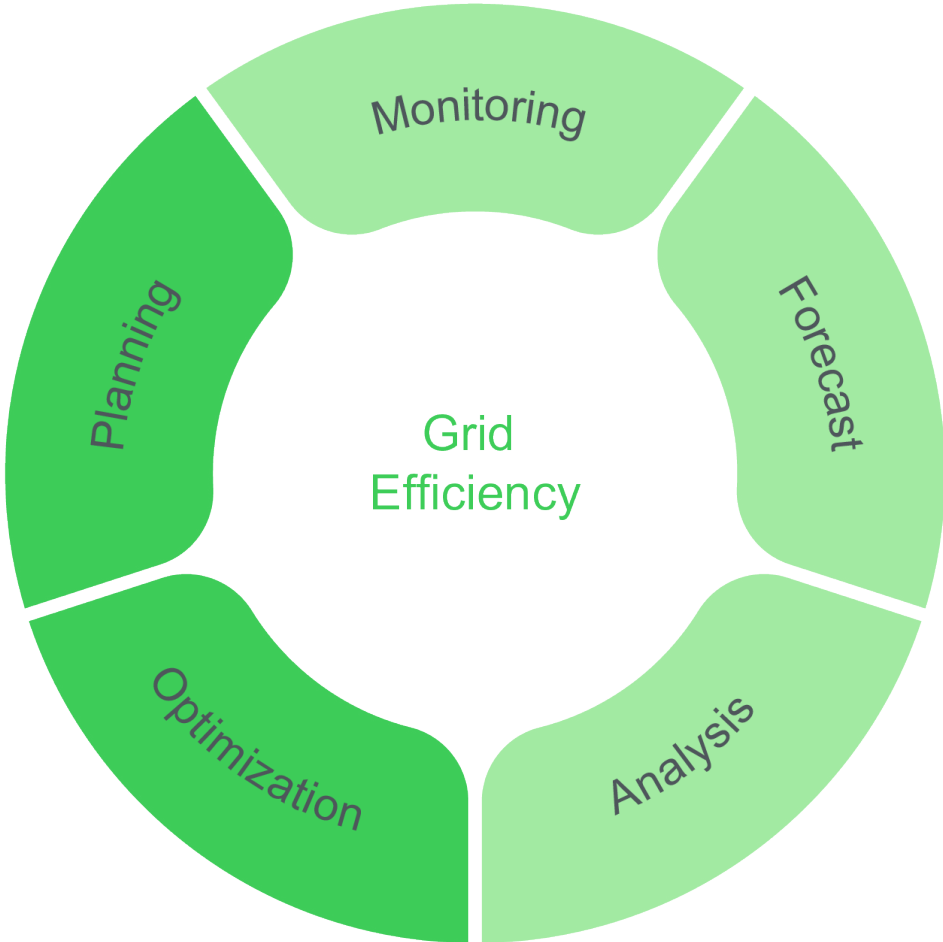
Smart grid technologies serve a utility by enabling optimized and efficient management of electric power system that maximizes the utilization of existing grid assets, optimizes power flows and defers capital investments.

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Grid Efficiency

Offers

ESSENTIAL	STANDARD	PROGRESSIVE	ULTIMATE
✓ Core DMS Apps	✓ Core DMS Apps	✓ Core DMS Apps	✓ Core DMS Apps
✓ Core EMS Apps	✓ Core EMS Apps	✓ Core EMS Apps	✓ Core EMS Apps
✓ Single Pane of Glass HMI	✓ Single Pane of Glass HMI	✓ Single Pane of Glass HMI	✓ Single Pane of Glass HMI
✓ Templated Model Management	✓ Templated Model Management	✓ Templated Model Management	✓ Templated Model Management
✓ ICCP	✓ ICCP	✓ ICCP	✓ ICCP
Load Profile Generator	✓ Load Profile Generator	✓ Load Profile Generator	✓ Load Profile Generator
Thermal Monitoring	✓ Thermal Monitoring	✓ Thermal Monitoring	✓ Thermal Monitoring
(Automatic) Volt Var Optimization	✓ (Automatic) Volt Var Optimization	✓ (Automatic) Volt Var Optimization	✓ (Automatic) Volt Var Optimization
Network Reconfiguration	✓ Network Reconfiguration	✓ Network Reconfiguration	✓ Network Reconfiguration
Load Relief	✓ Load Relief	✓ Load Relief	✓ Load Relief
Advanced Switching Management	✓ Advanced Switching Managemen	✓ Advanced Switching Management	✓ Advanced Switching Management
Forecast (NT, ST, MT)	✓ Forecast (NT, ST, MT)	✓ Forecast (NT, ST, MT)	✓ Forecast (NT, ST, MT)
Optimization & Constraint Mng.	✓ Optimization & Constraint Mng.	✓ Optimization & Constraint Mng.	✓ Optimization & Constraint Mng.
Contingency Analysis	✓ Contingency Analysis	✓ Contingency Analysis	✓ Contingency Analysis
WebDMD	✓ WebDMD	✓ WebDMD	✓ WebDMD
Adaptive Relay Protection	Adaptive Relay Protection	✓ Adaptive Relay Protection	✓ Adaptive Relay Protection
Reliability Analysis	Reliability Analysis	✓ Reliability Analysis	✓ Reliability Analysis
EMS Look-Ahead Contingency Analysis	EMS Look-Ahead Contingency Analysis	✓ EMS Look-Ahead Contingency Analysis	✓ EMS Look-Ahead Contingency Analysis
EMS Relay Protection	EMS Relay Protection	✓ EMS Relay Protection	✓ EMS Relay Protection
Large Area Restoration (LAR)	Large Area Restoration (LAR)	✓ Large Area Restoration (LAR)	✓ Large Area Restoration (LAR)
LV Network Model & DMS	LV Network Model & DMS	✓ LV Network Model & DMS	✓ LV Network Model & DMS
EMS Fault Analysis	EMS Fault Analysis	✓ EMS Fault Analysis	✓ EMS Fault Analysis
Network Planning	Network Planning	✓ Network Planning	✓ Network Planning
EMS Voltage Stability	EMS Voltage Stability	✓ EMS Voltage Stability	✓ EMS Voltage Stability
Automatic Protection	Automatic Protection	Automatic Protection	✓ Automatic Protection
Automatic LAR, NR & Load Relief	Automatic LAR, NR & Load Relief	Automatic LAR, NR & Load Relief	✓ Automatic LAR, NR & Load Relief
DMS Planning Applications	DMS Planning Applications	DMS Planning Applications	✓ DMS Planning Applications
LV optimization & analysis apps	LV optimization & analysis apps	LV optimization & analysis apps	✓ LV optimization & analysis apps
Available addons	Available addons	Available addons	
AMI Integration	Load Profile Updater	Long-Term Forecast	
ArcFM Data Exporter	CIM Network Export (from ADMS)	EMS Voltage Stability	

| Clean energy for sustainable future | Stepwise approach to sustainability | Operational Efficiency | Reliability & Resilience | Grid Efficiency | Grid Flexibility | Partnership for the future |

Grid Efficiency

Key Benefits

More than 40 field-proven applications that provide monitoring, forecast, analysis, optimization, and planning of the grid.

Estimated benefits of EcoStruxure™ ADMS optimization apps for a utility with 2.5M customers are:

- VVO: 3m€

- Network auto-reconfiguration: 10m€

- Large area reconfiguration: up to 30m€

US utility generated 173 GWh of energy savings in the period of two years (~$10M USD) by using EcoStruxure ADMS VVO.

One of Schneider Electric customers from Europe reported:

- Avoided energy losses of 4% per year (144 GWh and 75000 tCO2)

- Cost reduction of 5.7 m€/year
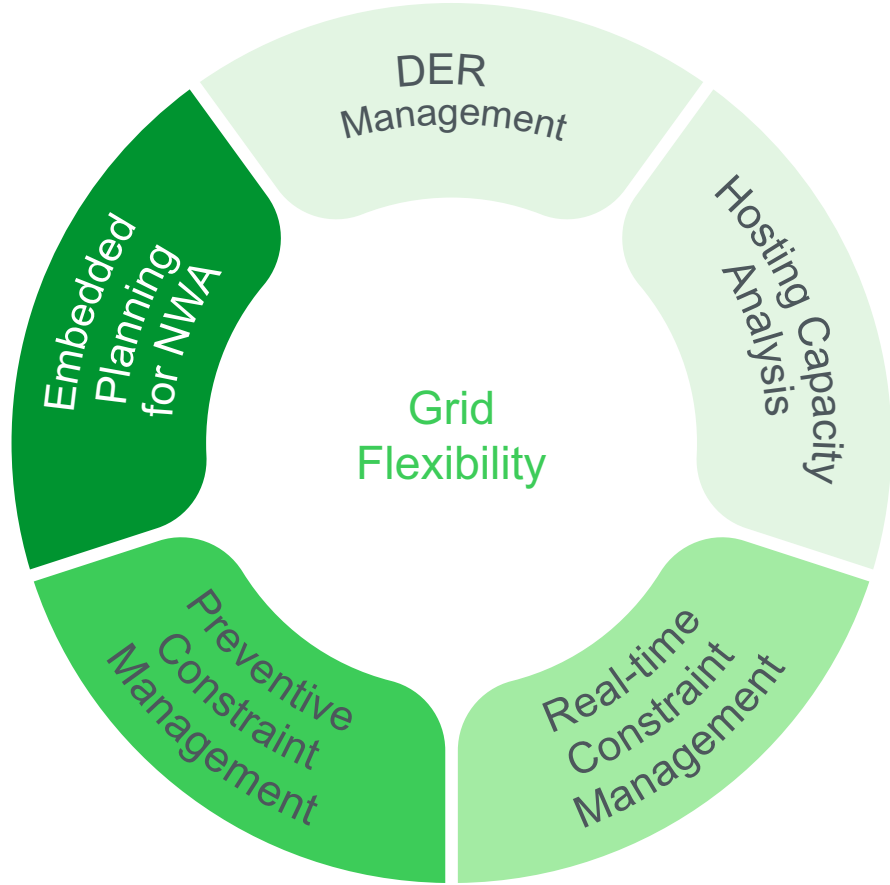
Grid Flexibility

Grid Flexibility

Drivers and solution

The distribution network is shifting towards a future with much higher penetration of distributed energy resources (DERs). This shift is driven by the changes in customer choices around energy and technological development leading to lower costs and better performance of DER. New policies and regulatory proceedings are requiring utilities and utility customers to embrace DERs in many forms. All these changes relate to the ultimate goal of reaching zero CO_2 emissions.

Being in charge of the distribution grid planning and operation, the electric utilities are a key enabler of this clean energy transition and are facing considerable challenges on their journey of integrating DERs. The success shall be measured by reaching a fully flexible electricity grid that can host all DERs of today and the future.

DER Management
Hosting Capacity Analysis
Grid Flexibility
Embedded Planning for NWA
Real-time Constraint Management
Preventive Constraint Management

Schneider Electric EcoStruxure™ ADMS Grid Flexibility package is a fundamental building block in the strategy towards DER integration. By covering both flexible grid planning and operation, the solution represents a complete, innovative, and grid-aware answer to orchestrated dispatching of DERs for managing and optimizing the grid while releasing network capacity.

Clean energy for sustainable future | Stepwise approach to sustainability | Operational Efficiency | Reliability & Resilience | Grid Efficiency | Grid Flexibility | Partnership for the future

Grid Flexibility

Offers

ESSENTIAL	STANDARD	PROGRESSIVE	ULTIMATE
✓ DER Management ✓ DER Aggregation ✓ Hosting Capacity Analysis ✓ Customer Connection Analysis ✓ Single Pane of Glass HMI ✓ Templated Model Management ✓ ICCP ✓ OSIsoft PI Historian Integration ✓ Load Profile Generator Real-time Constraint Management Forecast WebDMD Network Planning Look-Ahead Constraint Mngmt IEC 61968-5 DERMS Integration LV Network Model Long-Term Forecast DMS Planning Applications Automatic Demand Flexibility LV DMS Planning Applications Big Data Connector **Available addons** IEEE 2030.5 (R3.9) ArcFM Data Exporter	✓ DER Management ✓ DER Aggregation ✓ Hosting Capacity Analysis ✓ Customer Connection Analysis ✓ Single Pane of Glass HMI ✓ Templated Model Management ✓ ICCP ✓ OSIsoft PI Historian Integration ✓ Load Profile Generator ✓ Real-time Constraint Management ✓ Forecast ✓ WebDMD Network Planning Look-Ahead Constraint Mngmt IEC 61968-5 DERMS Integration LV Network Model Long-Term Forecast DMS Planning Applications Automatic Demand Flexibility LV DMS Planning Applications Big Data Connector **Available addons** Load Profile Updater	✓ DER Management ✓ DER Aggregation ✓ Hosting Capacity Analysis ✓ Customer Connection Analysis ✓ Single Pane of Glass HMI ✓ Templated Model Management ✓ ICCP ✓ OSIsoft PI Historian Integration ✓ Load Profile Generator ✓ Real-time Constraint Management ✓ Forecast ✓ WebDMD ✓ Network Planning ✓ Look-Ahead Constraint Mngmt ✓ IEC 61968-5 DERMS Integration ✓ LV Network Model ✓ Long-Term Forecast DMS Planning Applications Automatic Demand Flexibility LV DMS Planning Applications Big Data Connector	✓ DER Management ✓ DER Aggregation ✓ Hosting Capacity Analysis ✓ Customer Connection Analysis ✓ Single Pane of Glass HMI ✓ Templated Model Management ✓ ICCP ✓ OSIsoft PI Historian Integration ✓ Load Profile Generator ✓ Real-time Constraint Management ✓ Forecast ✓ WebDMD ✓ Network Planning ✓ Look-Ahead Constraint Mngmt ✓ IEC 61968-5 DERMS Integration ✓ LV Network Model ✓ Long-Term Forecast ✓ DMS Planning Applications ✓ Automatic Demand Flexibility ✓ LV DMS Planning Applications ✓ Big Data Connector

Grid Flexibility

Key Benefits

DSO focused

Designed and built for the Distribution System Operator (DSO) and their business drivers and processes.

Improves customer satisfaction

Increases quality of power delivery while supporting customer choices around energy. Enables reliable and efficient integration of high levels of DER.

Defers Expenditures

Postpones capital investments in grid infrastructure. Optimizes grid operations combining network assets and DER flexibilityImproves customer satisfaction.

### Scalability

Supports small, proof-of-concept projects to full-scale deployment rollouts.

Partnership for the future

Schneider Electric's EcoStruxure™ ADMS solution which is based on four pillars: Operational Efficiency, Reliability & Resilience, Grid Efficiency, and Grid Flexibility fundamentally supports utilities throughout their energy transition towards sustainability in a stepwise approach.

With a strong global presence and satisfied customers across the world, Schneider Electric offers a personalized approach to utilities that want a partner for their digital transformation and sustainability journey.

Life Is On | Schneider Electric
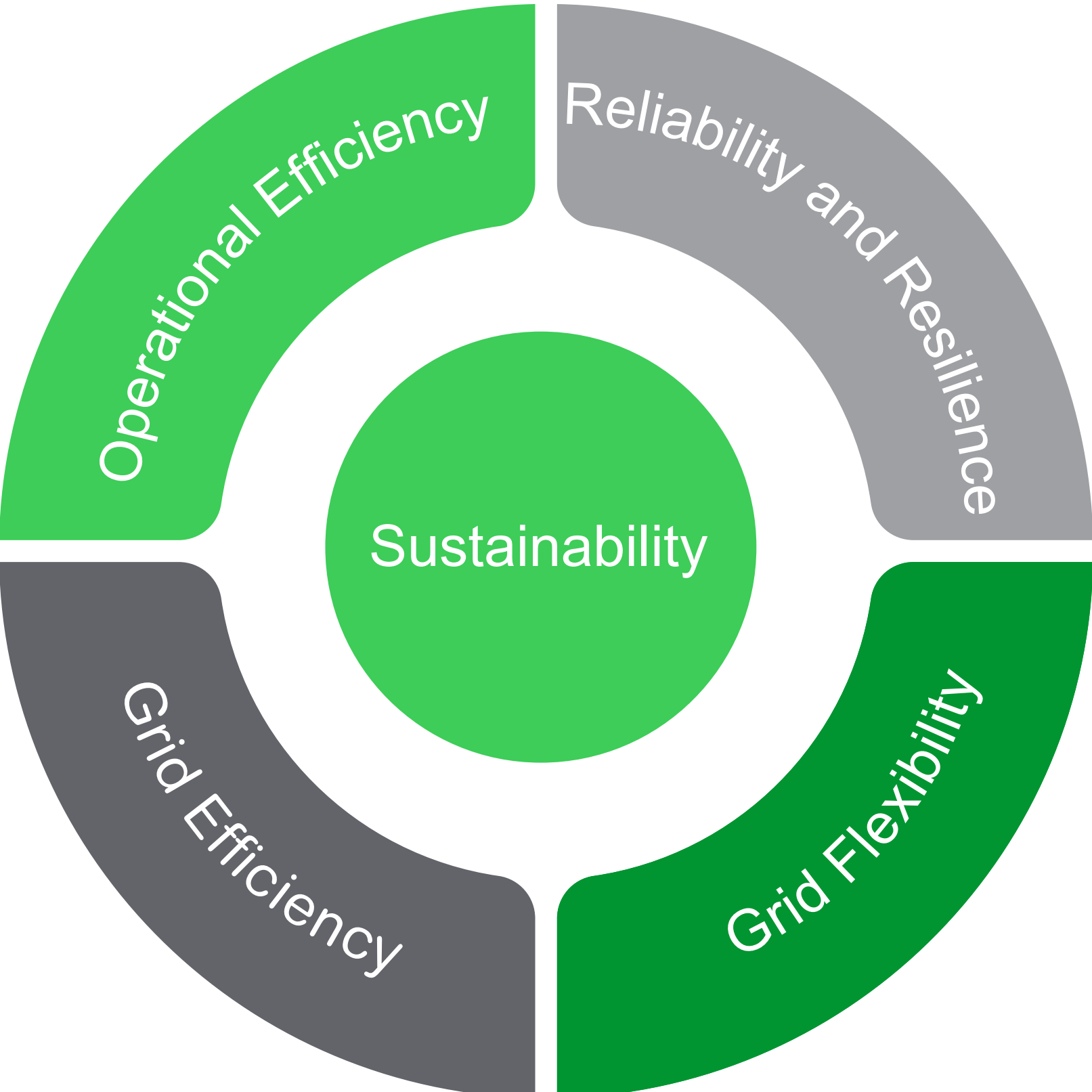
For more information about EcoStruxure ADMS
visit schneider-electric.com/ecostruxure-adms today!

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