



INNOVATION

Advanced Distribution Management Systems The Foundation of Distribution System Operations

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A new energy world is emerging

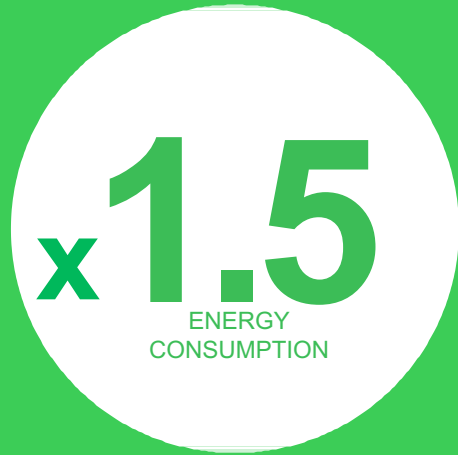
**More
ELECTRIC**

**More
DIGITIZED**

**More
DECARBONIZED**

**More
DECENTRALIZED**

Our challenge in the next 40 years



Forecast for 2050 compared to 2009 levels
Source IPCC, IEA 2014-2015, Schneider Internal Analysis

The Traditional Grid: Simple & Linear



Centralized
generation



Transmission &
distribution



End-use
consumption

The New Grid: The Rise of DER



Centralized
generation



Transmission &
distribution

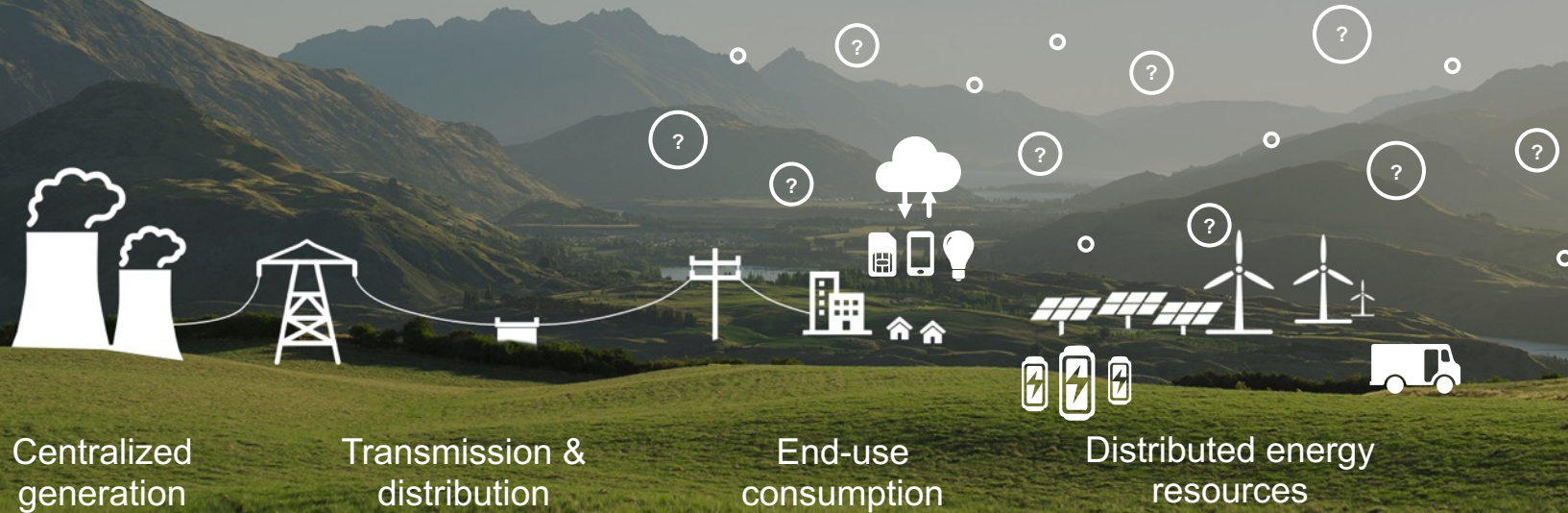


End-use
consumption



Distributed energy
resources

The Future of the Grid: Distributed & Multi-Directional



Utility Challenges



Grid efficiency and security

- Manage **complex systems** efficiently
- Reduce **network overloads** and **failures**
- Maximise ROI in network planning
- Cyber **security**



New energy resources

- Integrate **renewable generation** and **grid edge energy sources**
- Enable **end-user participation** in the energy market



Asset management

- Large number of assets distributed over **large geographical areas**
- Large population of **aging old assets** with **no connectivity**
- Large amounts of **data**

The Role of Distribution System Operators (DSO's)

DSOs must provide:

- > **Reliable** and **affordable** grid operations
- > Ensure the grid operates within **technical and operational limits** providing reliable electricity to customers
- > Enable the grid to be **more resilient** under fault conditions, generation losses and cyber threats
- > Coordinate with Transmission System Operators (TSOs) to support **overall system optimization**
- > Support a growing list of **customer demands**
- > Network **investment planning**
- > Identify systemwide options for **capacity provisioning** including **flexible energy services** that help reduce traditional network investment and enable **greater market participation**

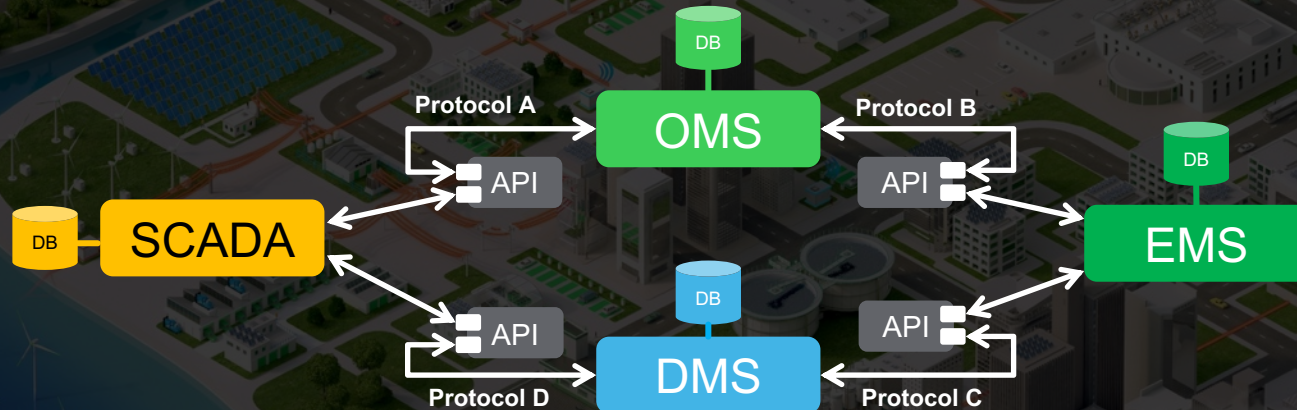
EcoStruxure Grid – A holistic approach to smart utilities



The Traditional Way

Separated SCADA, DMS, OMS & EMS systems, with:

- > **Complex** data exchange interfaces
- > Multiple, **uncoordinated** updates
- > **Complex** administration & maintenance



The New ADMS Way

Fully integrated application for network management

- > One System platform
- > One User Interface
- > One Database
- > One Network Model
- > One configuration
- > One system to maintain

ADMS

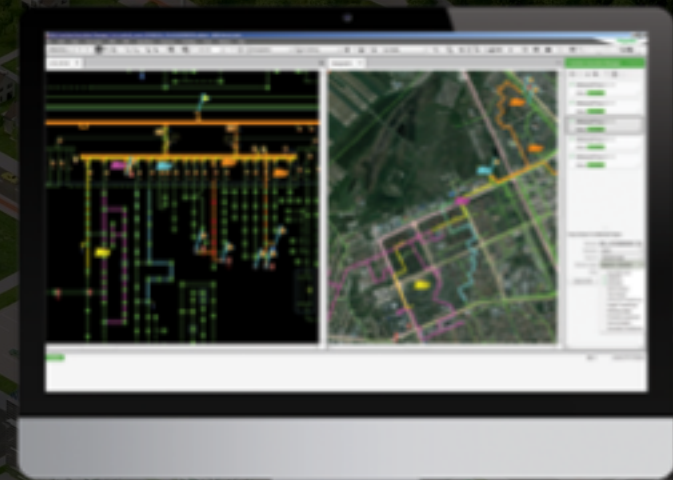
SCADA

DMS

OMS

EMS

UNIFIED DATA MODEL & DATABASE



The New ADMS Way

ADMS

SCADA

DMS

OMS

EMS

PCS

DERM

OAM

SCADA (Supervision, Control And Data Acquisition)

Remote control and monitoring

DMS (Distribution Management System)

Distribution network analysis, smart operation, optimization and planning

OMS/WFM (Outage Management System)

Management of outages, scheduled works, workforce, trouble calls and web field clients

EMS (Energy Management System)

Transmission network analysis, smart operation, optimization and planning

PCS (Power Control System)

Generator control and monitoring

DERM (Distributed Energy Resources Management)

Modeling, monitoring, forecast and control of distributed energy resources

OAM (Operational Asset management)

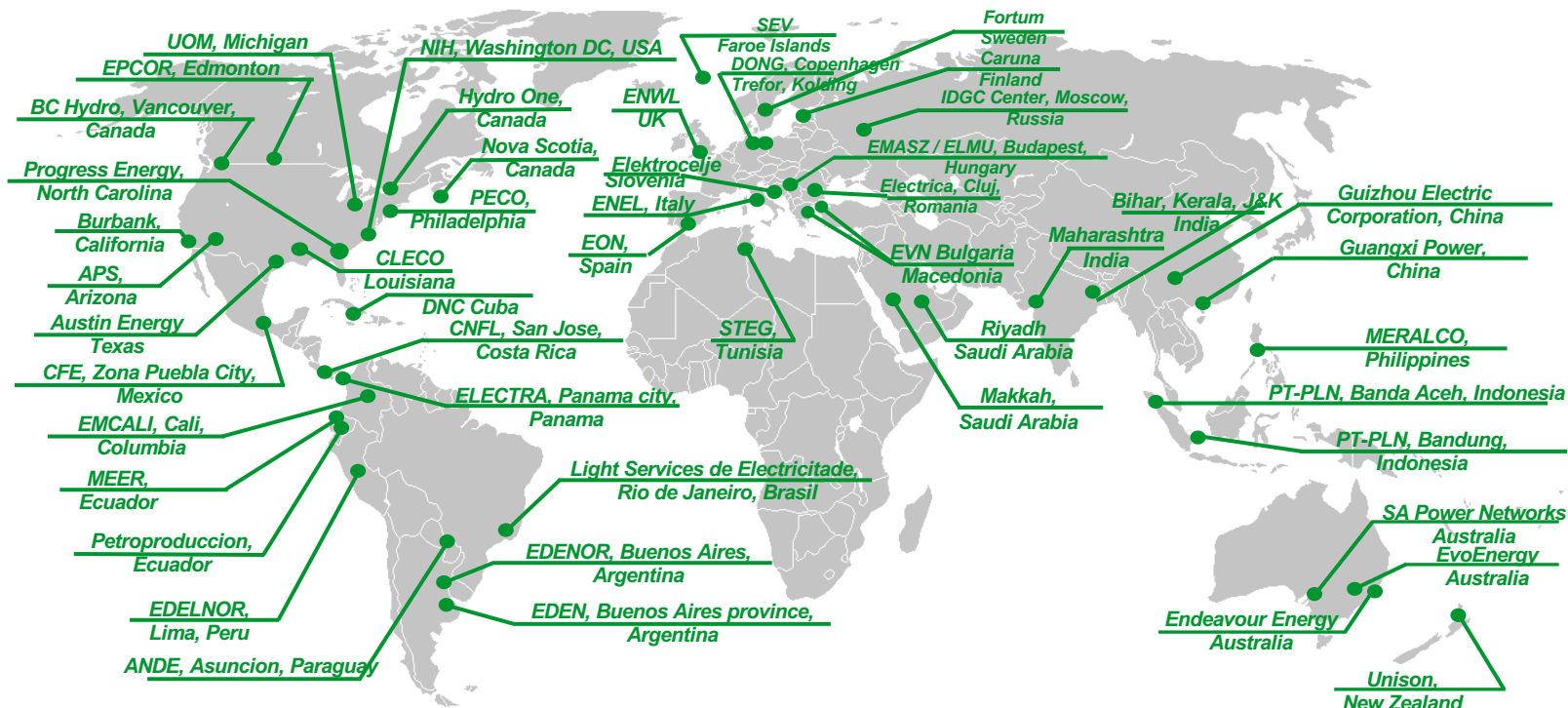
Tracking and analysis of asset operation, maintenance & planning

The Role of ADMS

- > Manage **voltage fluctuations** and **reverse power flows**
- > Manage **intermittent sources** of generation
- > Manage **electric vehicle integration** to the grid
- > Manage **energy storage integration** in the grid
- > Provide **grid flexibility** to accommodate **VPPs** and **microgrids**
- > Optimize existing equipment and **limit new capital investments**
- > Reach higher levels of **customer satisfaction**

SE EcoStruxure ADMS

68 Utilities, 90 million electrical consumers, 153 Control Centres



Conclusion - ADMS Benefits

- > Improved **total cost of ownership** and **capital investment**
- > Improved **safety** and **reliability** of network operations
- > Reduced **peak demand** and **power losses**
- > Reduced **outage time** for customers
- > Improved **performance indicators** (regulatory KPIs)
- > Improved **utilization** of network facilities – deferred investment

Life Is On



Schneider
Electric