



Solar Connectivity

Advanced monitoring and control for renewable power plants

Po-Chen Kung

Buildings and IT Business - Partner Division

Schneider Electric, the global specialist in **energy management and automation**

€26.6 billion

FY 2015 revenues

~5%

of revenues devoted to R&D

~160,000

people in 100+ countries

Diversified end markets – FY 2015 revenues

Non-residential &
Residential Buildings

Industrial
& Machines

Utilities &
Infrastructure

Data Centers
& Networks

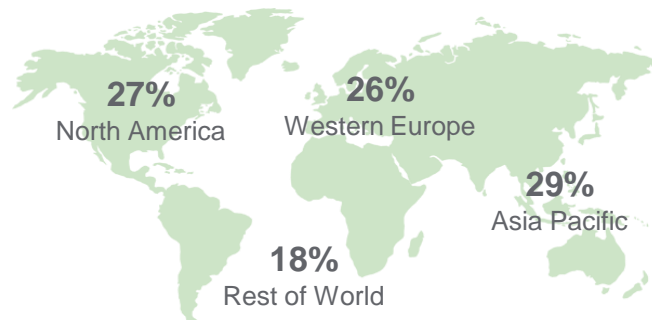
45%

21%

20%

14%

Balanced geographies – FY 2015 revenues¹



Schneider Electric the global specialist in energy management and automation


Infrastructure Business is the leader of Medium voltage and a front-runner in Smart Grid, Distributed Generation and Power Systems for industries and infrastructure.

INFRASTRUCTURE BUSINESS

- €5.3 Billion
- 21% Revenue
- #1 Worldwide
- Medium Voltage
- Grid Automation
- Distributed Generation

Software


SCADA / ADMS
Smart Metering



Asset Analytics, Network,
Demand Management

Automation


Substation Automation
System PACis, PSE


RTU, Protection Relays,
Micom, Sepam

Energy


Transformers


Switchgear


Circuit Breakers

Smart Grid

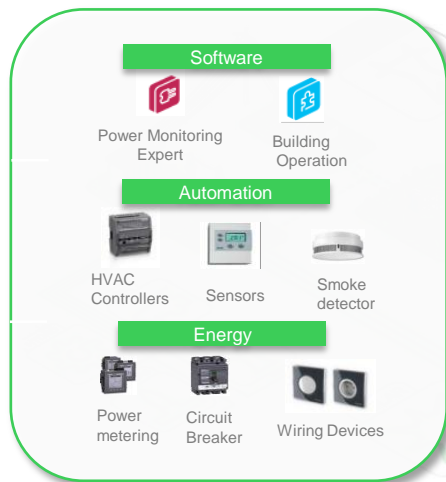
Distributed Generation

Efficient Demand

CONNECTED FROM PLANT TO PLUG

Schneider Electric the global specialist in energy management and automation

Partner Business partners with electrical and mechanical specialists to provide advanced IoT solutions to Buildings and low voltage



BUILDINGS & PARTNER BUSINESS

- €10.8 Billion
- 43% Revenue
- #1 Worldwide
- Low Voltage
- Building Automation
- Energy Efficiency and Comfort

Smart Grid

Distributed Generation

Efficient Demand

CONNECTED FROM PLANT TO PLUG

Schneider Electric the global specialist in energy management and automation

Industry Business brings automation to industry and infrastructure from machine manufacturers to process operators and leads manufacturing of the future.

INDUSTRY BUSINESS

- €5.6 Billion
- 22% Revenue
- #2 Discrete Automation
- #4 Process
- Automation
- Machine Automation
- Software

Software



Process expert

Plant operation

Automation



Automation components



Automation bundles

Energy



Drives

Smart Grid

Distributed Generation

Efficient Demand

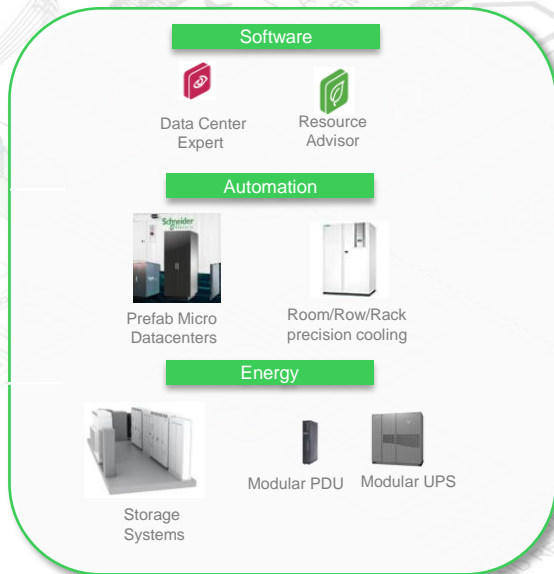
CONNECTED FROM PLANT TO PLUG

Schneider Electric the global specialist in energy management and automation

IT Business brings complete solutions for IT and defines the most advanced architectures for performance , cost and speed from from hyperscale to edge computing and networks and leads Energy Storage and Secured Power

IT BUSINESS

- €3.4 Billion
- 14% Revenue
- #1 Worldwide
- Critical Cooling
- Secure Power
- Edge Computing
- IoT
- DC
- Storage



Smart Grid

Distributed Generation

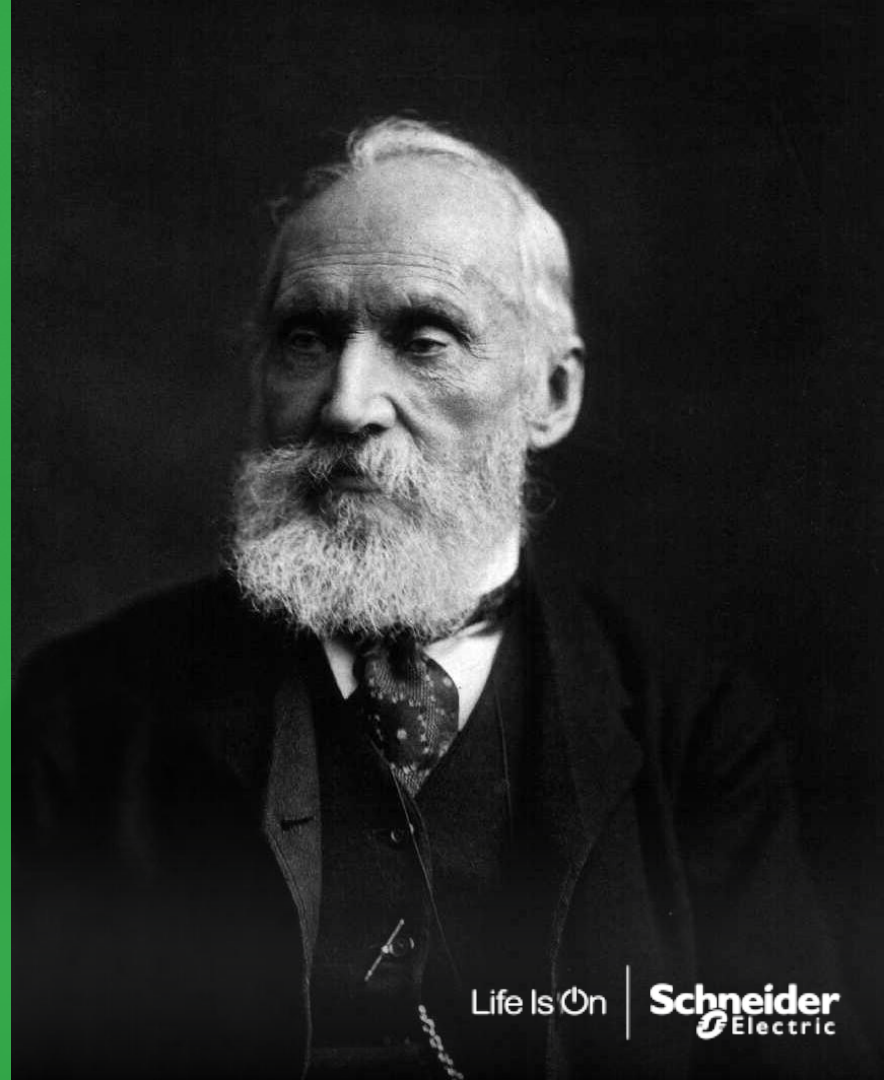
Efficient Demand

CONNECTED FROM PLANT TO PLUG

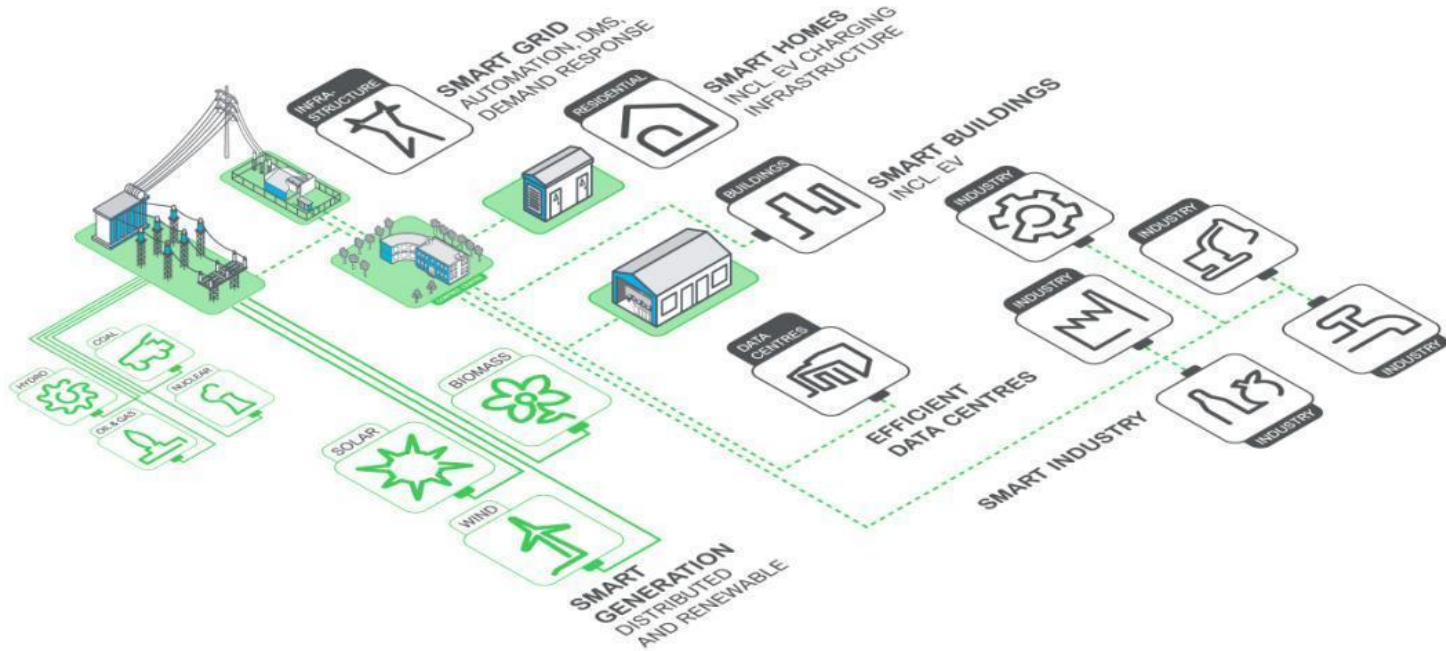
Improving the performance of your PV assets

“If you can not measure it,
you can not improve it.”

- Lord Kelvin (Sir William Thomson)



The New World of Energy: Electricity is Distributed & Connected



Smart Grid

Distributed Generation

Efficient Demand

CONNECTED FROM PLANT TO PLUG

FOR A STRONGER ROI IN SOLAR POWER GENERATION

Advanced monitoring and control of PV assets

Manage operations
and equipment

Track system
performance

Receive **useful**
guidance

Comply with
power grids

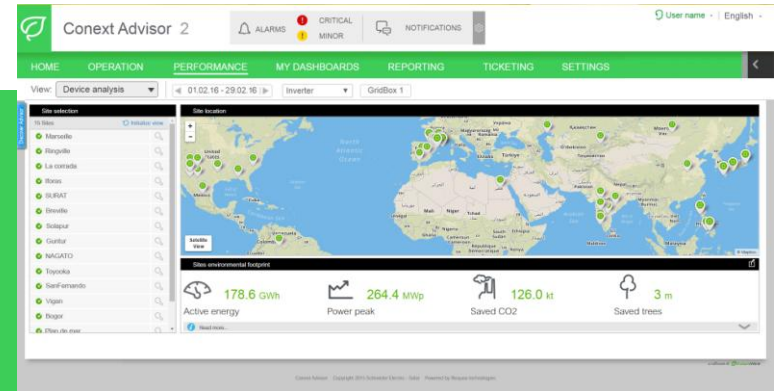
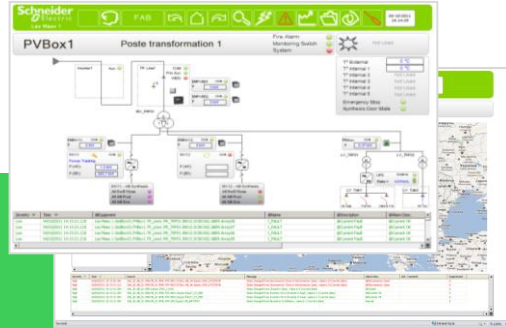
Forecast critical
performance factors

Produce clear
actionable **reports**



Cloud Services

Manage O&M and optimize performance in a single web portal



Cloud Services

A full suite of professional tools for all your professional users in one portal

Control room tools for operators



Total control of the inverter
and the entire PV infrastructure

Data mining tools for technical analysts



Technical KPIs reveal long-term trends
and point to efficiencies

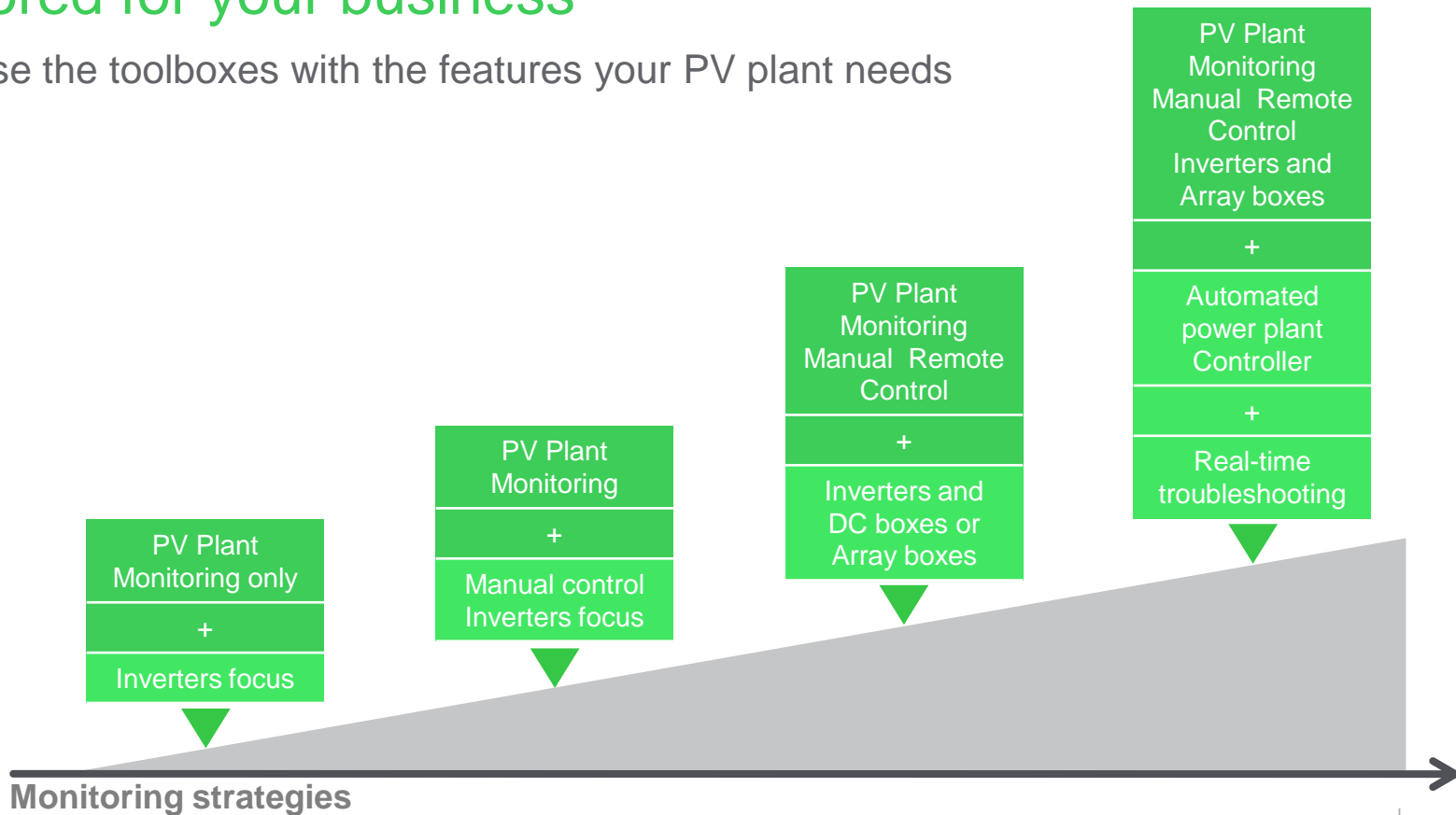
Cost/revenue tools for financial users



Analyze and forecast revenues
and ROI

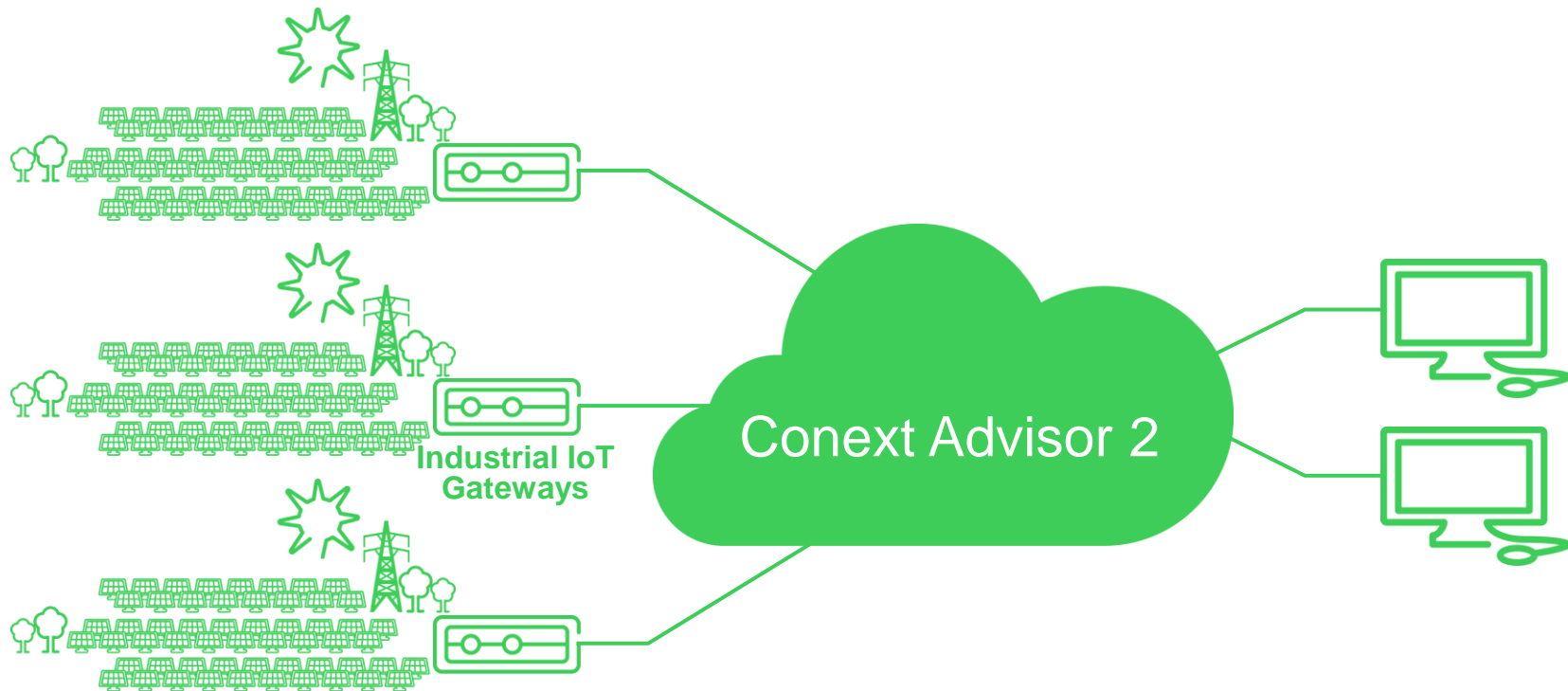
Tailored for your business

Choose the toolboxes with the features your PV plant needs



Moving to the Cloud

Smart systems on site feed data to cloud-based monitoring & control



Sales Model

CAPEX

- Install/commission PV Box / PV Skid monitoring cabinet for centralized inverters
- **No more** PV Box / PV Skid monitoring cabinet – now integrated in the SmartGen Inverter
- Grid Box monitoring cabinet collect the entire PV plant's data and feeds it to the Cloud

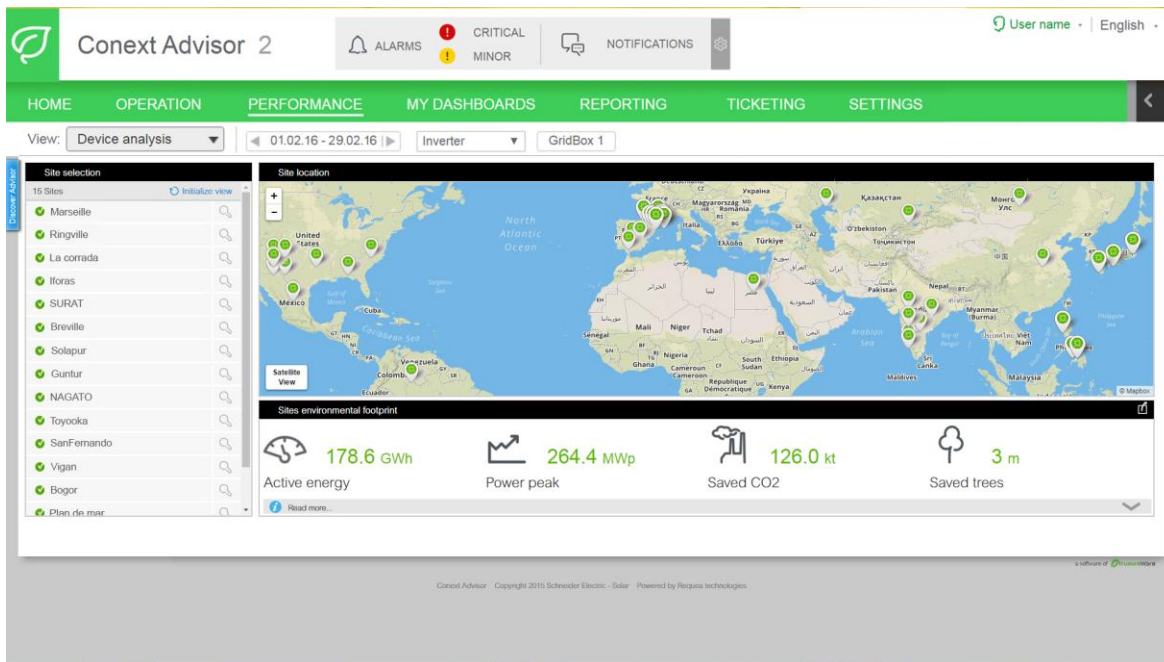
**CAPEX reduced by
industrial IoT and Cloud**

OPEX

- Annual subscription for portal access: spreads costs over time
- Tailored packages and features: pay only for features you need
- Advanced options: Manual Remote Control, Production Forecast, Energy Not Supply automated repartition, and more

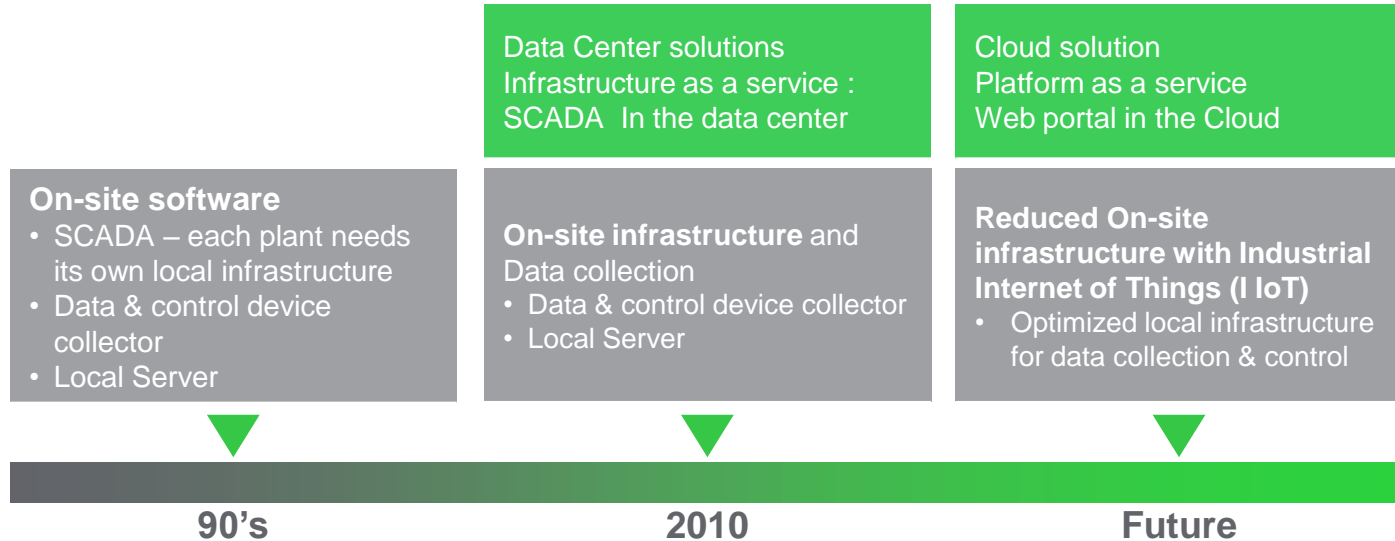
**OPEX System management in the Cloud,
software as a service**

Presentation



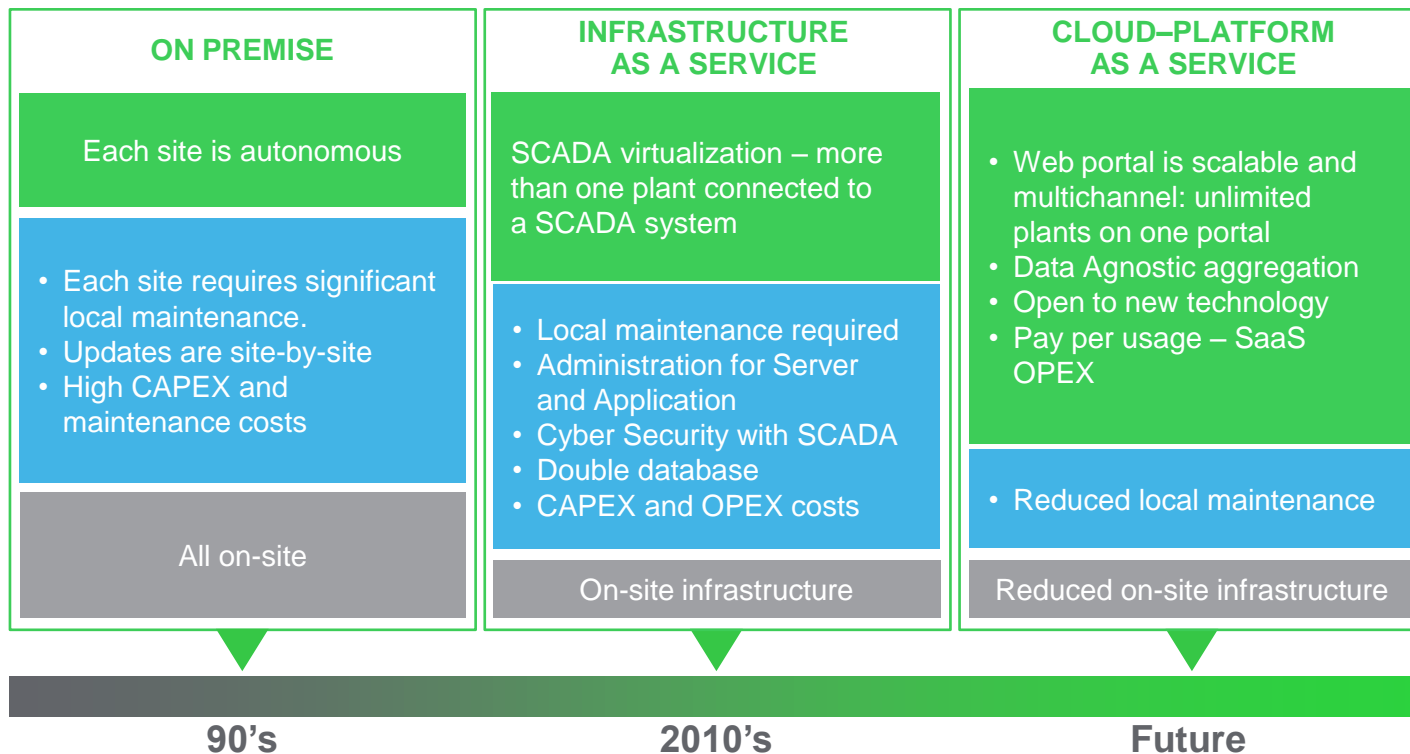
Power Plant Technology & Maintenance

Migrating from the site to the Cloud



Power Plant Technology & Maintenance

Migrating from on-site to the Cloud



Conext Advisor 2

Bringing all the benefits of the Cloud to PV

- **High availability**, from anywhere to anyone, system is backed up by redundant Cloud servers.
- **Scalable processing and storage**: adapts to your changing needs over the entire Power plant life cycle
- **SaaS** – software as a service – pay for only what you use; move software investment from CAPEX to OPEX
- **Cloud Software updates** available to all plants on release, ensuring system-wide software consistency



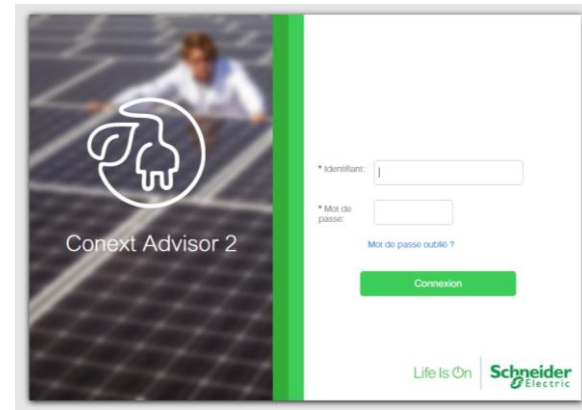
Microsoft Azure



Benefits of the Cloud

Cloud security

- Compliant with Cyber Security Standard
 - Secure Identity management (cloud-based).
 - HTTPS encrypted connection
 - Ring-fenced infrastructure
 - Data warehouses in secure private VPN with no external access.
-
- **Data security**
 - Redundant servers and disaster recovery systems, ensuring no loss of data



Microsoft Azure



Ready for the Future

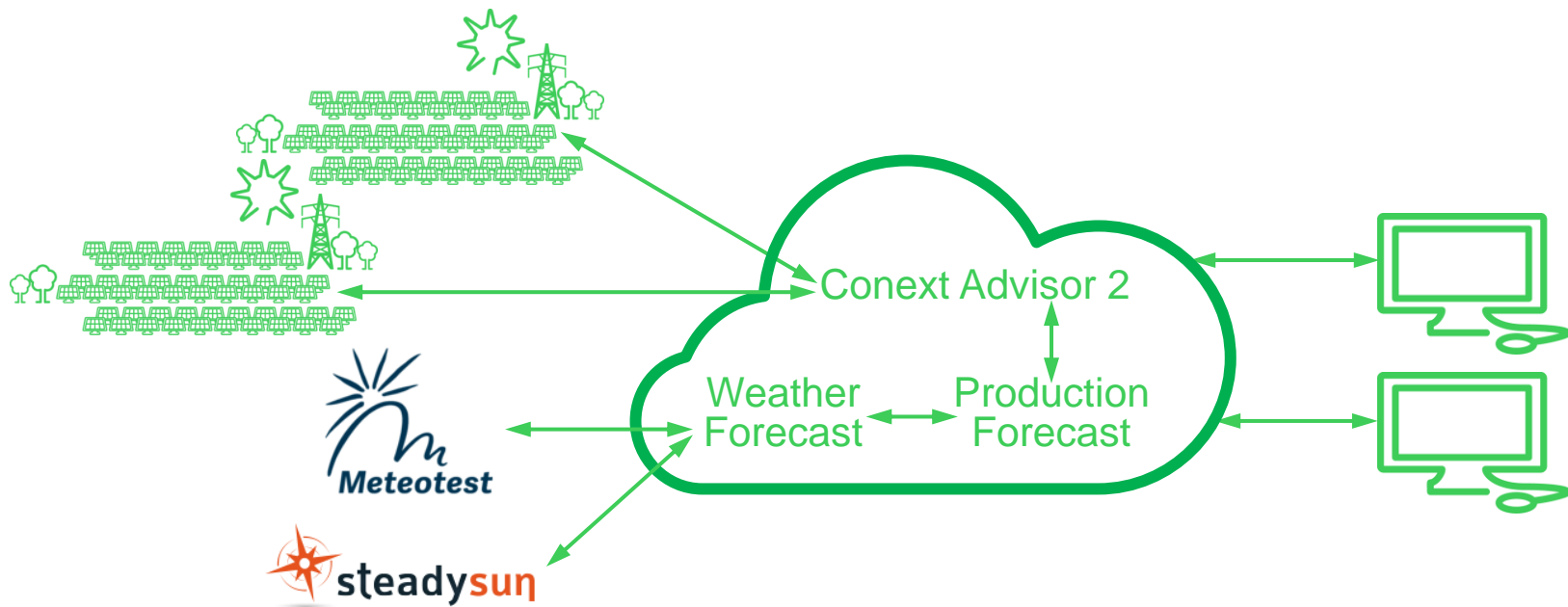
Open the door to new technologies and services

- **Big Data:** Cloud infrastructure is designed for massive – and growing — databases
- **Analytics:** Combining multi-source data supports important new features such as **Production Forecasts**
- **Machine Learning:** big data + intelligence enables services like predictive maintenance analysis, auto-detection of panel soiling, aging, shadows, and more.



Production forecasts

Synchronize power distribution to the grid, based on weather-related forecasts of solar production, allowing maximum penetration and revenue, without compromising grid stability.



Cloud-secure Manual Remote Control

Secure Manual Remote Control is now a reality thanks to the secure Cloud, plus the additional security of tokens & unique code verification via text message.



As the global specialist in
energy management and automation,
we create connected technologies that

RESHAPE INDUSTRIES



TRANSFORM CITIES



ENRICH LIVES





Thank you for your attention