

# Energy Efficiency Solutions from EV to Speed Drives (or: from the Future, down to Basics)

## by Schneider Electric

Razvan COPOIU  
SEE Vice President

Romanian Energy Efficiency Forum by GOVNET  
13.10.2016, Bucharest





Energy is the base of life.

# Life Is On

...when Energy is On.

We ensure energy is On by making it:

- ✓ Safe
- ✓ Reliable
- ✓ Efficient
- ✓ Sustainable
- ✓ Connected

# Megatrends are provoking a **rise** in Energy Demand

URBANIZATION

**+2.5B**

people in cities by 2050

Source: United Nations, DESA

DIGITIZATION

**50B**

connected things by 2020

Source: Cisco

INDUSTRIALIZATION

**+50%**

Energy consumption by 2050

Source: IEA



1.3

billion people currently do not have access to electricity

Another

1

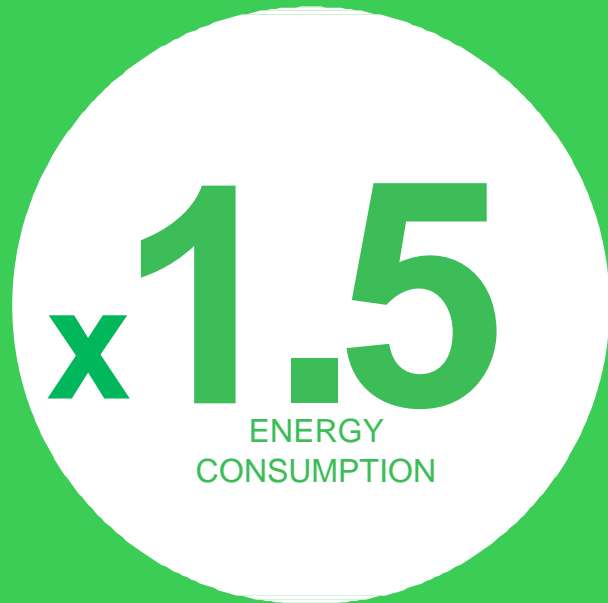
billion more have unreliable and intermittent supply of electricity

Source : IEA, Economist

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Schneider  
Electric

# Our Challenge in the next 40 years



Note: Forecast for 2050 compared to 2009 levels

# We have an opportunity to co-create the future

## More ELECTRIC

**2X** faster growth of electricity demand compared to energy demand by 2040

Source : IEA WEO 2014

## More DIGITIZED

**20X** more incremental connected devices than connected people by 2020

Source : Cisco, Internet World Statistics

## More DECARBONIZED

**82%** of the economic potential of energy efficiency in buildings and more than half in industry, remains untapped

Source : World Energy Outlook 2012, Internal Analysis

## More DECENTRALIZED

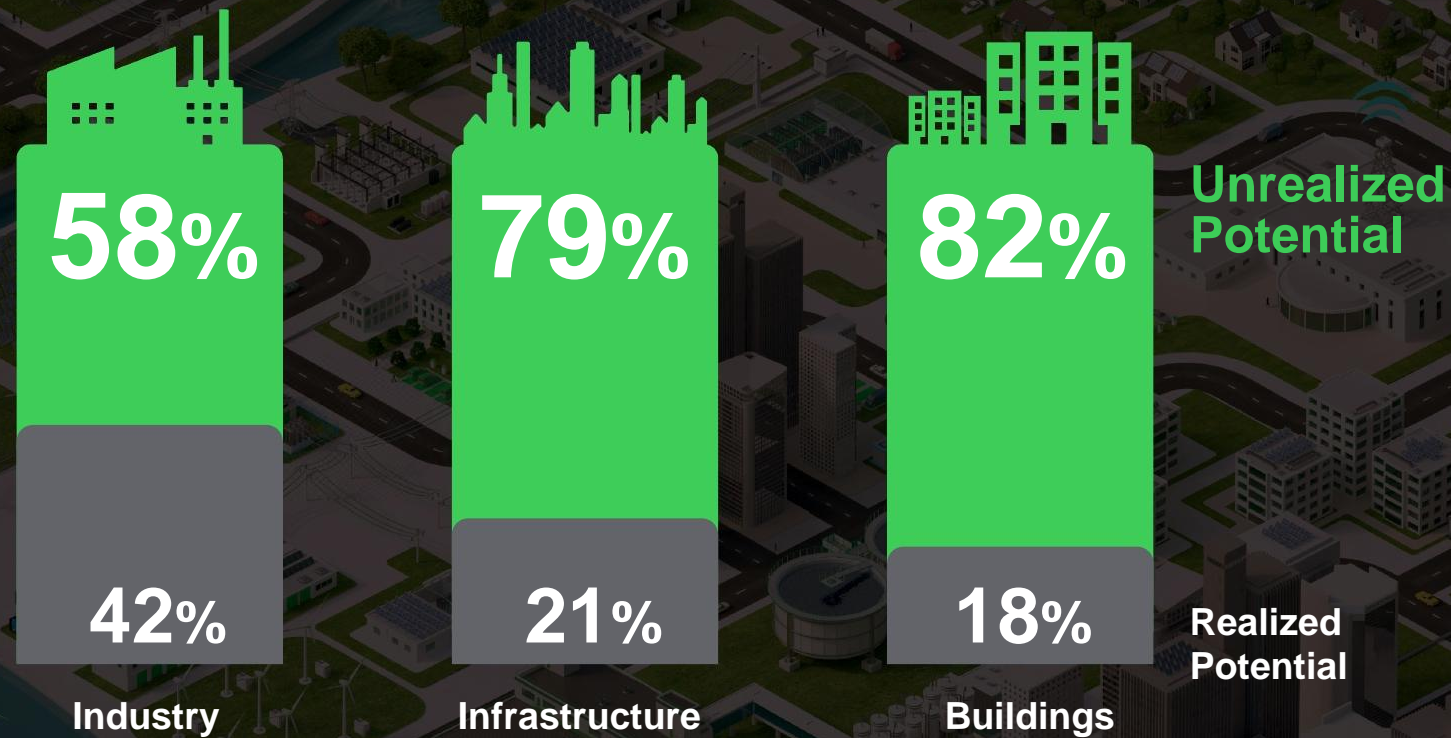
**70%** of new capacity additions will be in Renewables by 2040

Source : BNEF

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# We have massive untapped efficiency potential



Source : World Energy Outlook 2012, OECD / IEA, Internal analysis



# Schneider Electric the Global Specialist in Energy Management and Automation



**€26.6Bn**

FY 2015 revenues



**~ 5%**

of revenues devoted to R&D



**~160K+**

people in 100+ countries

Life Is On

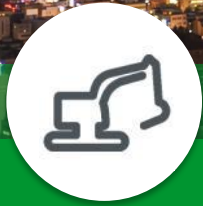
Schneider  
Electric



# Schneider Electric Innovation Impacts...



**20** of the largest **Oil and Gas** companies



**9** of the 10 largest **Mining, Metals and Minerals**



**11** of the top brands within **Food & Beverage**



**100+** **water and wastewater** plants



**1** million+ **Buildings** including 3 of top 5 hotel chains and approx. 40% of the world's **hospitals**



**10** of the world's top **electric utilities**



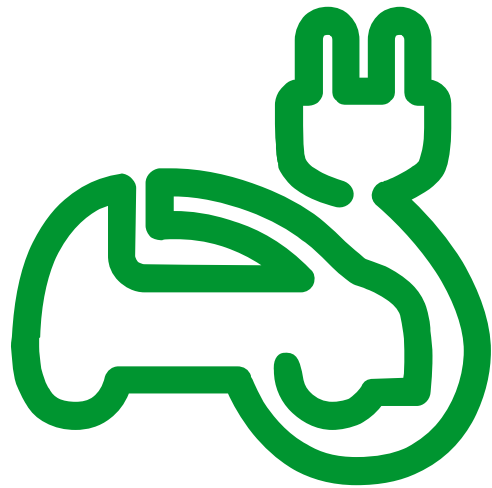
**3** of the top 4 biggest **hyper scale cloud** providers



**8** of the top 10 **packaging machine** builders

**The Future is here:**

**Electric vehicles and  
charging stations market**



# Electric vehicle market

## Facts and figures



> **+70%** between 2014 and  
2015

Source: Global EV Outlook 2016, International Energy Agency

↙ Vehicle cost

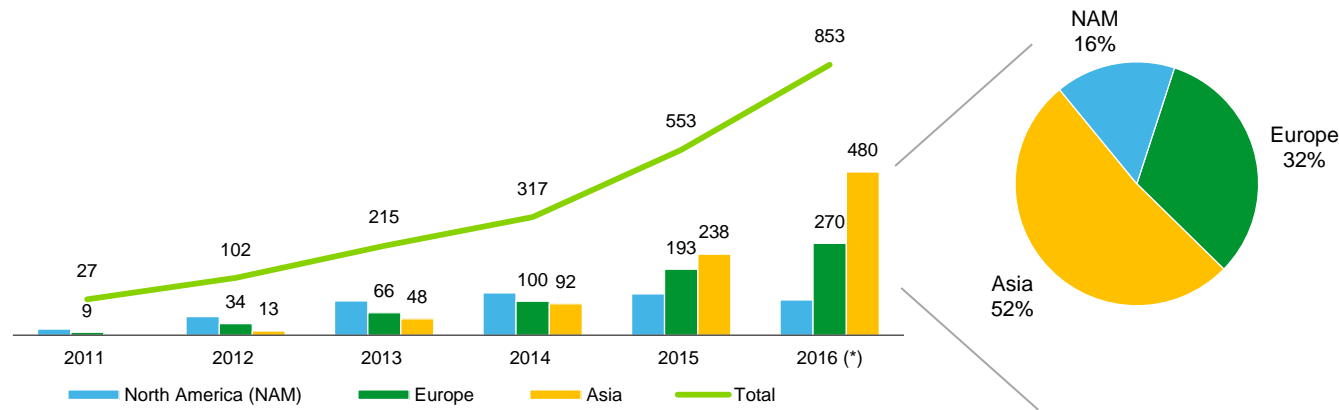
↗ Vehicle range

> Government incentives to:

- Favor EV purchase
  - > E.g. Tax reduction
- Develop charging infrastructure
  - > e.g. Regulation to impose EV parking spaces on public parking

# Electric vehicle market – Regional/Country (2015 + Q1 2016)

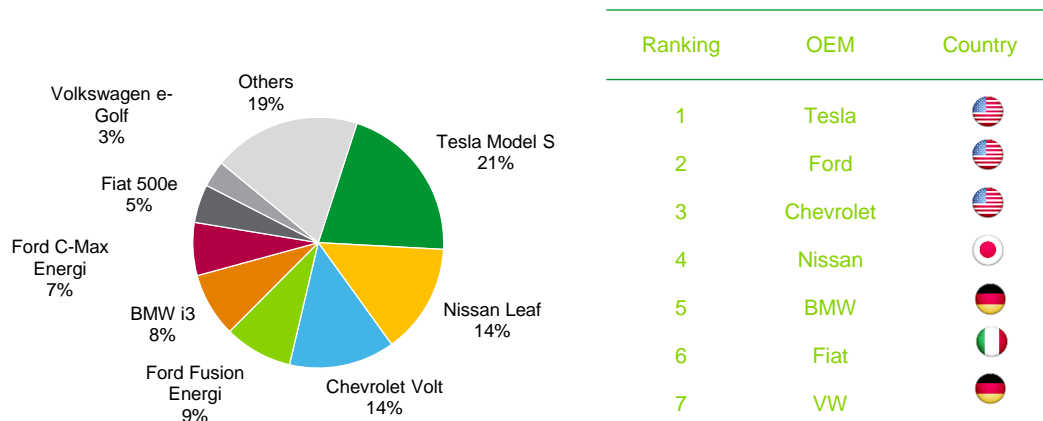
EV global sales volume (k units) regional split (\*)



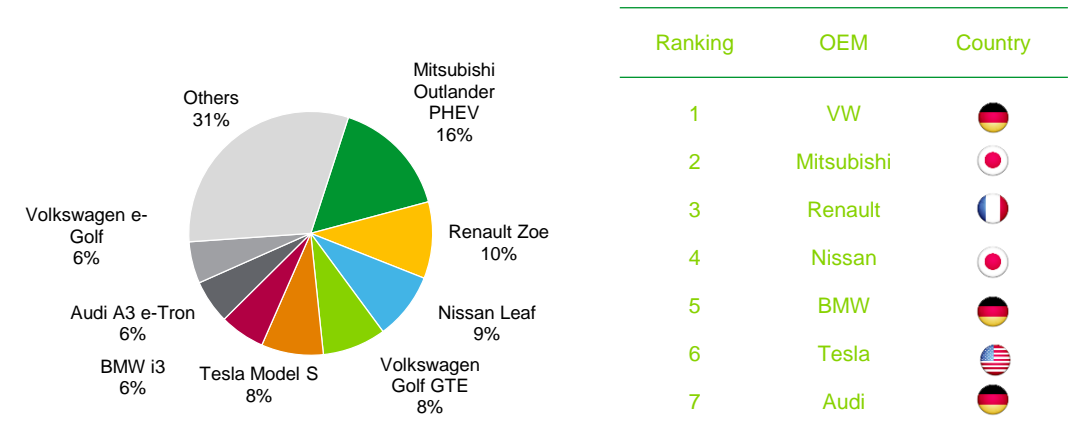
European sales breakdown per nation (\*\*)

	EV sales volume	Passenger car sales volume	EV share of total car sales
France	36 447	2 433 608	1,5%
Germany	30 064	3 997 466	0,8%
Netherlands	45 546	547 951	8,3%
United Kingdom	26 188	3 405 283	0,8%
Norway	45 446	187 774	24,2%

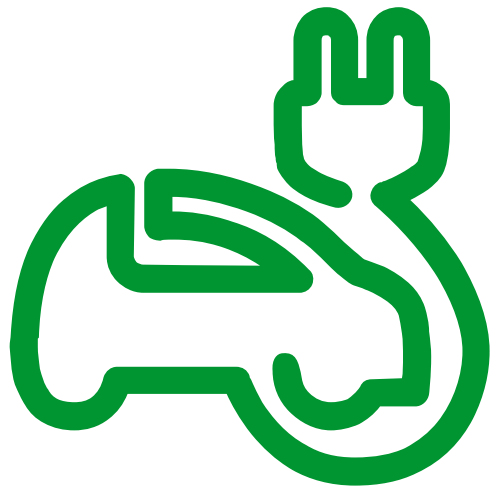
NAM sales volume breakdown per model & OEM (\*\*)



European sales volume breakdown per model & OEM (\*\*)



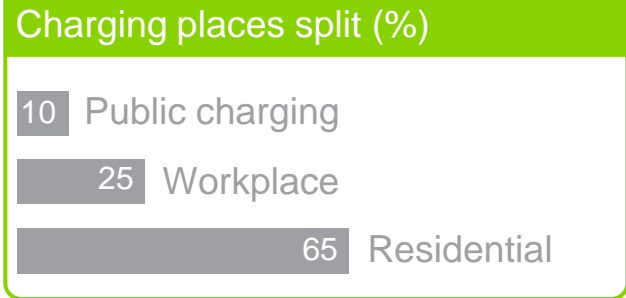
# EVlink story



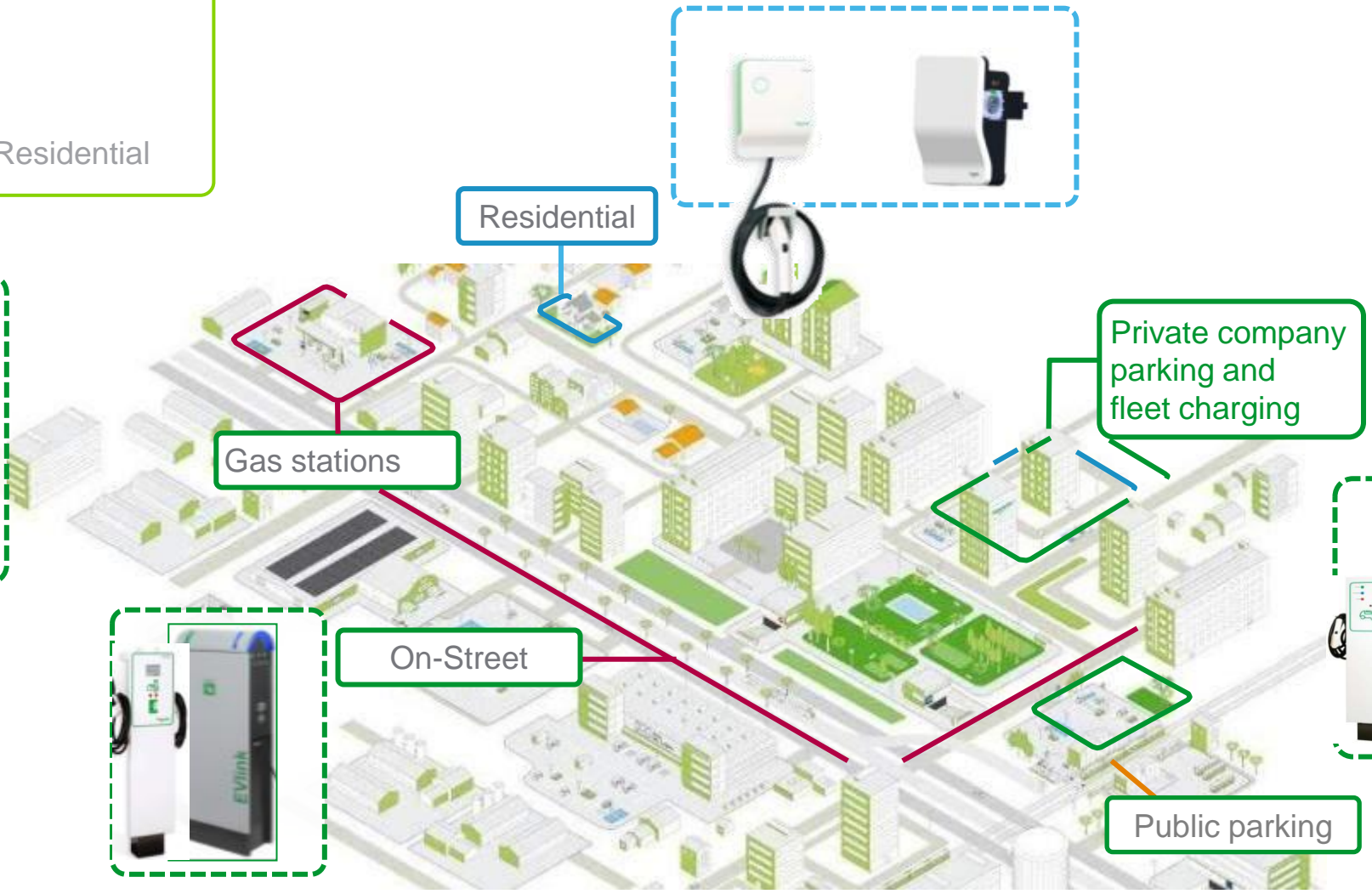
# EVlink product portfolio

## Overview

EVlink Wallbox	EVlink Smart Wallbox	EVlink Parking	EVlink City	EVlink Fast charge*
	 <p>Cloud-connectable</p>	 <p>Cloud-connectable</p>	 <p>Cloud-connectable</p>	 <p>Cloud-connectable</p>



Operator



# EVlink can charge your car in **2** ways

## Simple

Get Power in a secure way

## Smart

Get power in a secure way

Get connected to the Cloud

Benefit from Services support

Scalable: from first day of operation or later



**OCPP**

Protocol available on most of EVlink range

**EV**

Interoperability







Reliable products, smarter and sturdier:

## Services / Maintenance

- Products delivered with
  - Maintenance guide
  - Managed Spare Parts
  - Service offer catalogue



## Schneider Support

- WW Customer care support
- A network of trained Partners / Installers



## Schneider Green Premium

- ROHS compliant
- Reach compliant
- EoLi: End Of Life Process
- Product Environmental Profile



## Schneider Logistic

## Schneider premium assets

- Future standards oriented
- Premium car manufacturer partners: BMW, Renault, Volkswagen, Ford, Nissan, PSA,...



## Certification / Test / Quality

- Product range certified CB Scheme UL and IEC



- Outlet sockets and cables are tested with SE reinforced thermo-mechanical cycles
- Internal Labs
- Continuous EV tested bench to ensure interoperability with car evolutions
- Schneider quality process all along the offer creation





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Electric



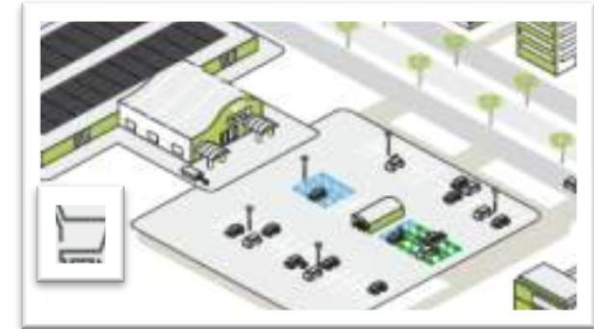


## Residential

*Offer to equip private parking, indoor or outdoor*



## Hotels and retails



*Offer to provide an additional or a complementary service offer to their customers.*

## Fleets & Offices



*Offer to manage EVs used by companies employees & visitors.*







## Car makers

*Offer to equip car dealer shops, plants, employee parking.*



## Fleets

*Offer to manage multiple EVs used by private or public companies for their operations.*



## Residential

*Offer to equip collective parking (condominium).*



## Hotels and retail

*Offer to manage multiple EVs used by companies employees & visitors.*



## Offices

*Offer to provide an additional or a complementary service offer to their customers.*







## Car leasers

*Offer to equip car leasers shops, employee parking.*



## Public infrastructures



*Offer to equip high ways  
Fast charge corridors*

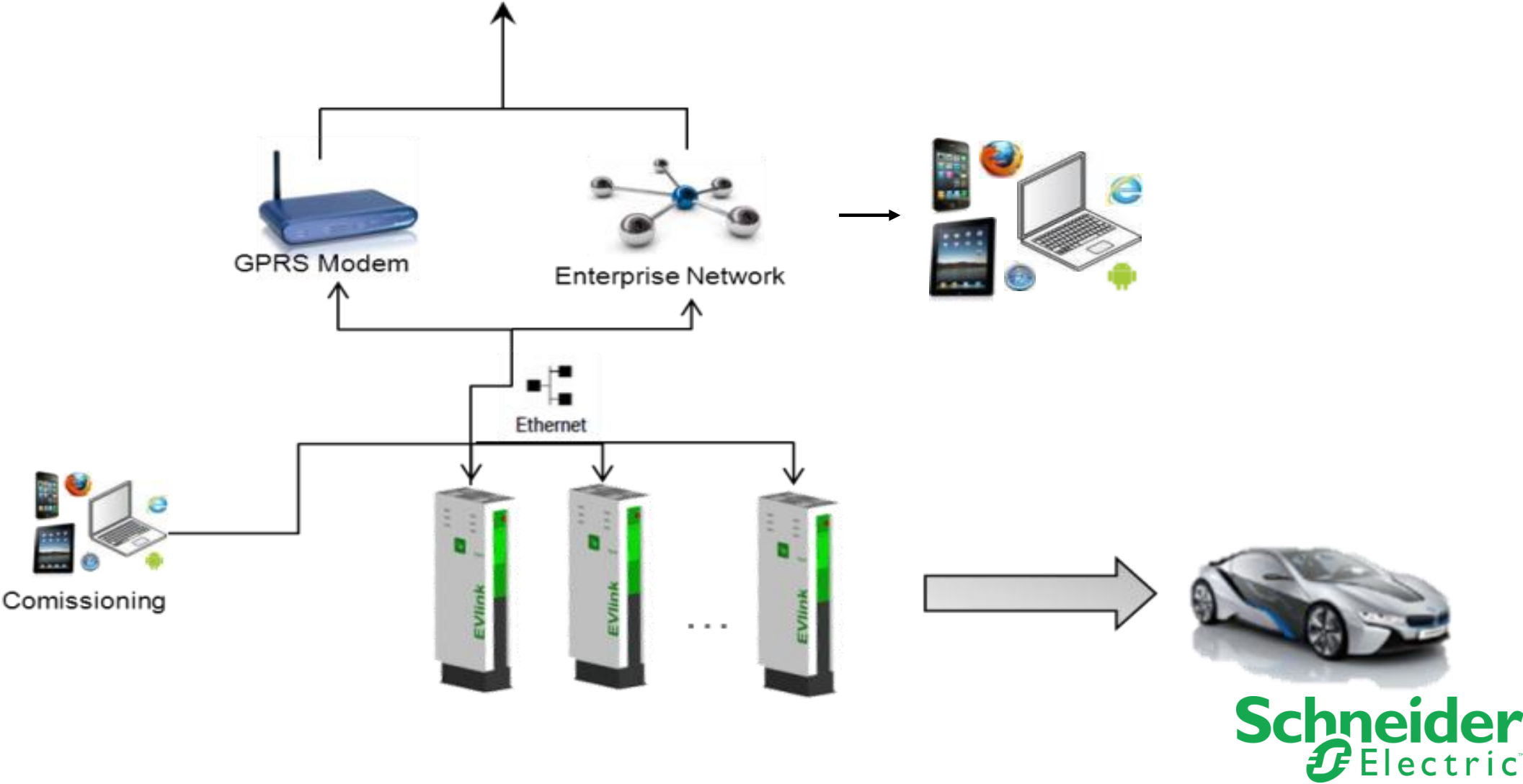
## Service stations

*Offer to equip service stations*



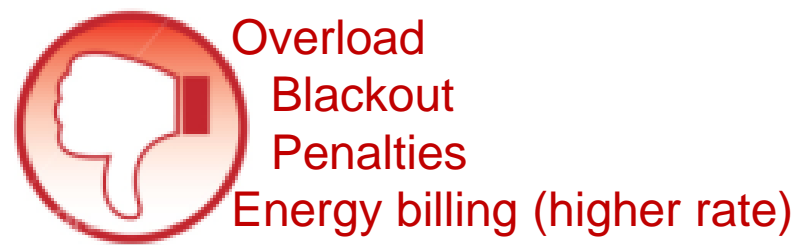
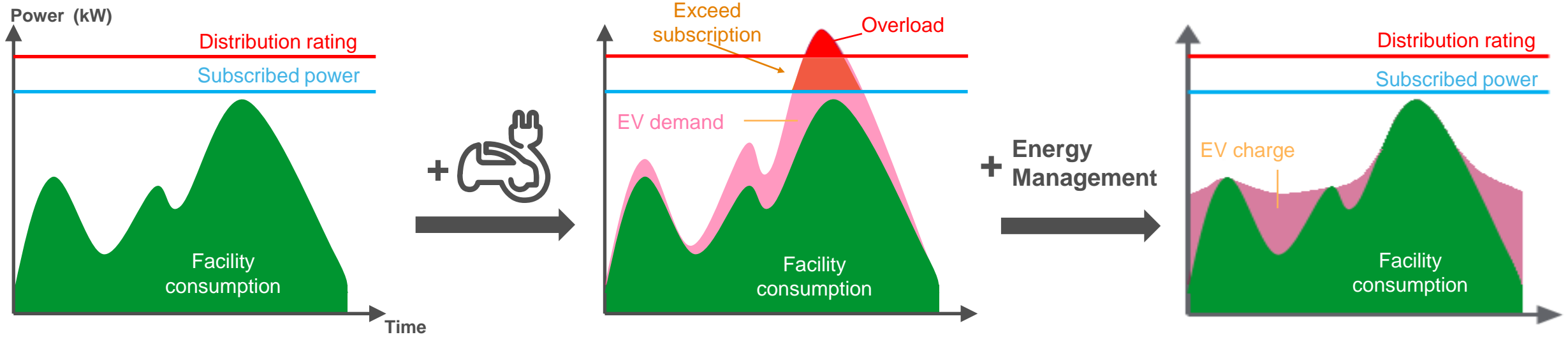


# 2. EVlink Energy Management





Electric Vehicle participate to electrical energy demand rise & increase the peak of power demand...





## Charge Point Operator User Interface

### e-Mobility Self Service

Manage access rights and generate reports...



### CONTROL

View status and remotely control infrastructure ...



## EV-driver frontend

### EV Driver Apps

Find charge points and start charging...



## SE Digital Service Platform

### Third Parties

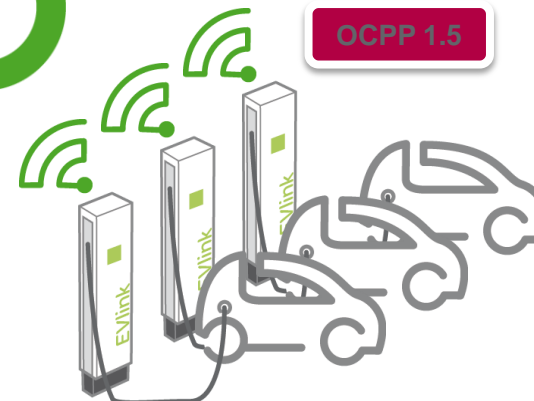
e.g. Hubject Roaming



Payment solutions



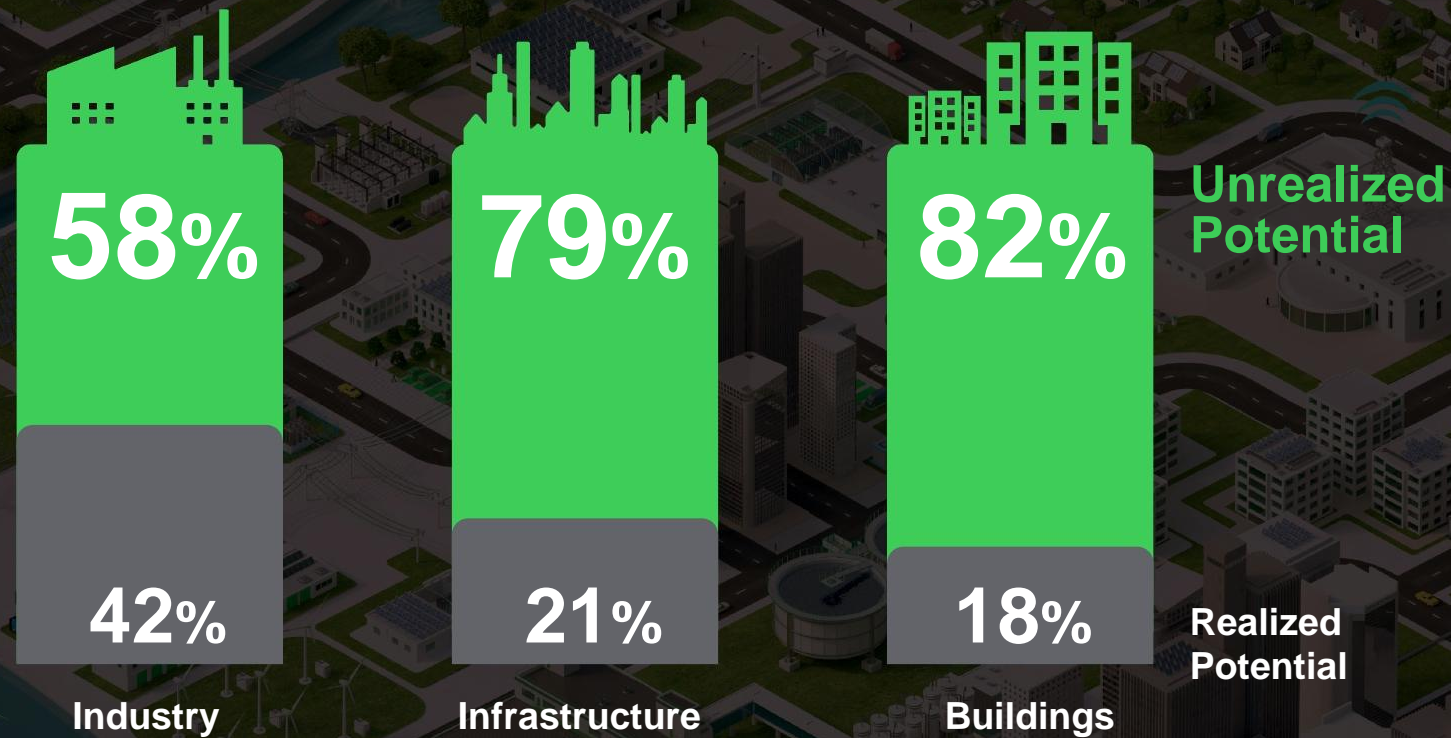
Ocpp 1.5





# **Back to Earth: The Classical Solutions**

# We have massive untapped efficiency potential



Source : World Energy Outlook 2012, OECD / IEA, Internal analysis

IN ONE ARCHITECTURE

# EcoStruxure™

EcoStruxure™  
BUILDINGS

EcoStruxure™  
POWER

EcoStruxure™  
UPS

EcoStruxure™  
DATACENTERS

EcoStruxure™  
GRID

EcoStruxure™  
INDUSTRY

EcoStruxure™  
GRID

EcoStruxure™  
INDUSTRY

EcoStruxure™  
BUILDINGS

EcoStruxure™  
DATACENTERS

# Smart Panels

Smart Panels 2015



- — measure
- — connect
- — save



**Schneider**  
Electric



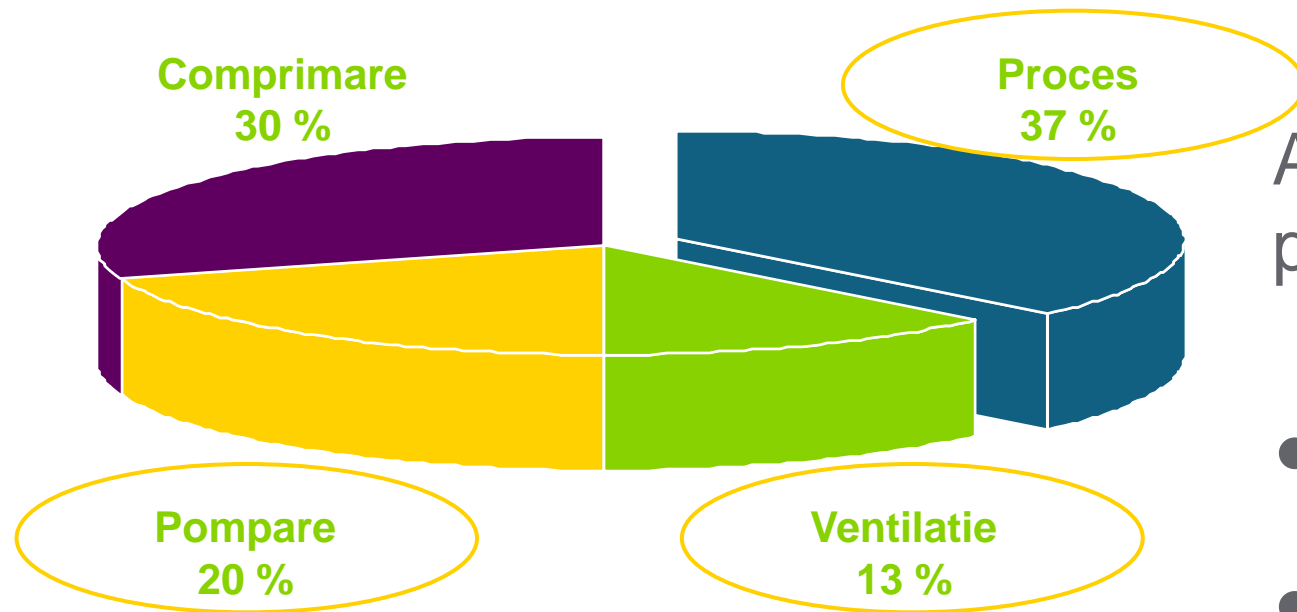
**Variatoare de viteza**

**Solutii avansate de eficienta energetica pentru Industrie  
by Schneider Electric**



# Aplicatii relevante

Peste **60 %** din consumul de energie se realizeaza la functionarea motoarelor in diverse procese si in cladiri



Aplicatiile relevante cu un potential mare de economisire:

- Pompare
- Ventilatie

**La un debit de 80%, consumul de energie se reduce cu 50%**

# Variatoarele de Viteza

Variatoarele de viteza conduc la obtinerea de **economii de energie**

- Pompe, Ventilatoare
- Macarale Complet Automatizate

*pana la 40%*

**Cea mai verde energie este cea pe care o economisesti !**

# Beneficii

Dupa instalarea de variatoare de viteza in instalatii:

- Consumul de energie electrica poate scadea pana la **40%**
- Perioada de recuperare a investitiei: **1-3 ani**

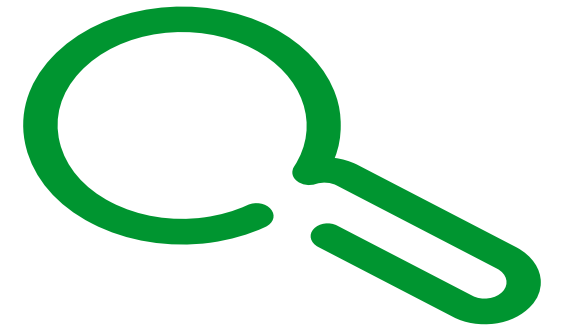
Alte beneficii:

- variatoare cu **web server integrat**
- Control superior al debitului
- Reducerea puterii reactive consumate
- Reducerea costurilor de intretinere

# Solutiile Schneider Electric

- Audit de Eficienta Energetica ( pentru echipamente electrice)
- Solutii-pachet bazate pe rezultatele auditului
- Verificarea realizarii economiilor dupa instalarea solutiilor

**Vizitati referintele noastre !**



Audit de Eficienta Energetica



**SCHNEIDER  
INNOVATION  
AT EVERY  
LEVEL**

Life Is On

**Schneider**  
Electric



# Back-Up Slides with more details

# MORE ELECTRIC

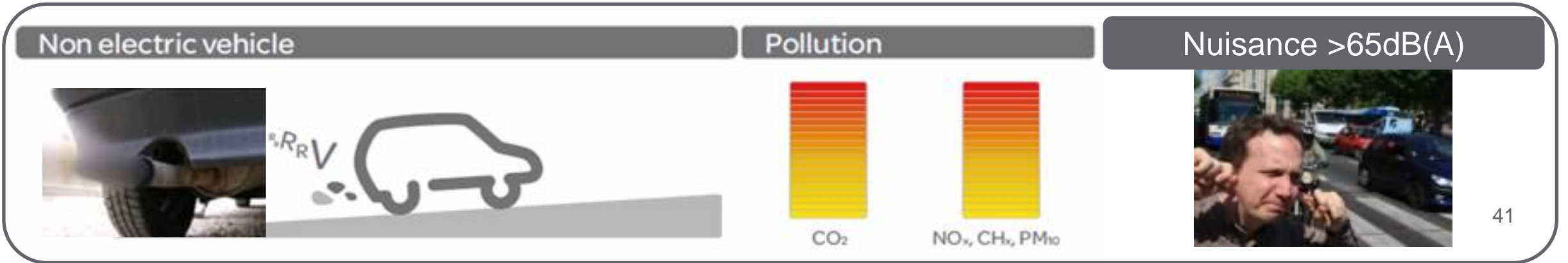
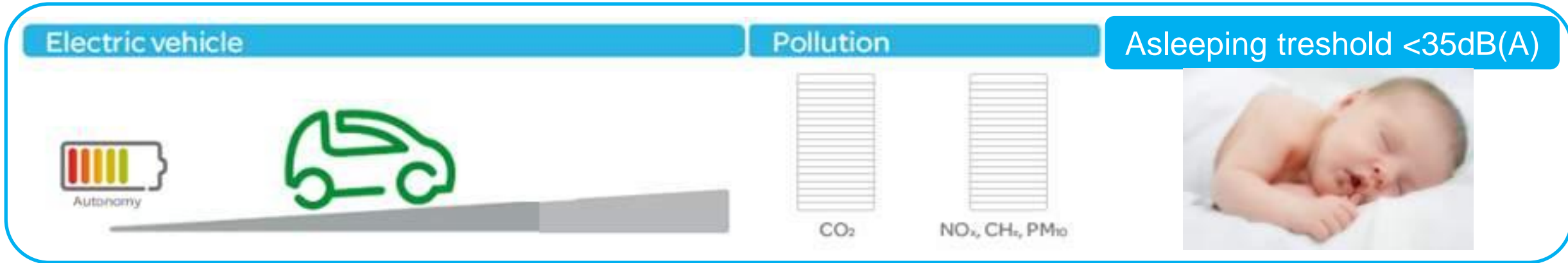
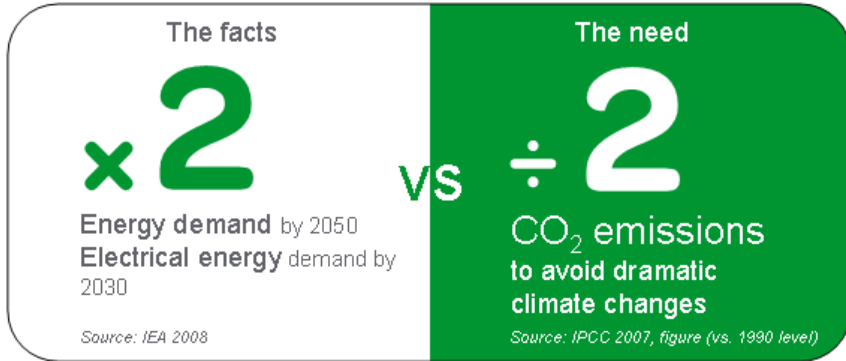
Global energy consumption will increase by **40%** in the next 25 years





# Environment challenges

**Transportation** is responsible for 25% to 30% of CO<sub>2</sub> emissions



# Electric vehicle market

## Charger capacity range

PHEV

**3,7 kW**

Audi A3 e-Tron Audi Q7 e-Tron BMW X5 eDrive Ford Cmax Energi VW XL1  
 Mercedes c350e Mitsu Outlander PHEV Porsche 918 Porsche Cayenne Hybrid VW Passat GTE  
 Porsche Panamera Toyota Prius Volvo V60 Volvo XC90 VW Golf GTE

**74% of registration WW**

**7,4 kW**

BMW 2-series BMW i8

**5% of registration WW**

**11 kW**

Mercedes GLE500e

**19% of registration WW**

**22 kW**

Audi R8 e-Tron Mercedes S500

BEV

Bolloré Blue C Chevrolet Volt Citroen Berlingo First Electric Citroën C-Zero Fisker Karma  
 Ford Focus Electric Mia Electric Mitsubishi i-Miev Nissan e-NV200 Nissan Leaf  
 Opel Ampera Peugeot iON Renault Fluence ZE Renault Kangoo ZE Renault Twizy  
 Smart fortwo Electricdrive Volvo C30 electric VW e-Golf VW e-Up

BMW i3 Nissan e-NV200 Kia Soul EV Nissan Leaf

Mercedes Class B-ED Tesla Model S Tesla Model X

BYD e6 Mercedes SLS AMG E-cell Mercedes Vito E-cell Peugeot Partner  
 Renault Zoé Smart fortwo Tesla Model X Tesla Model S Tesla Roadster

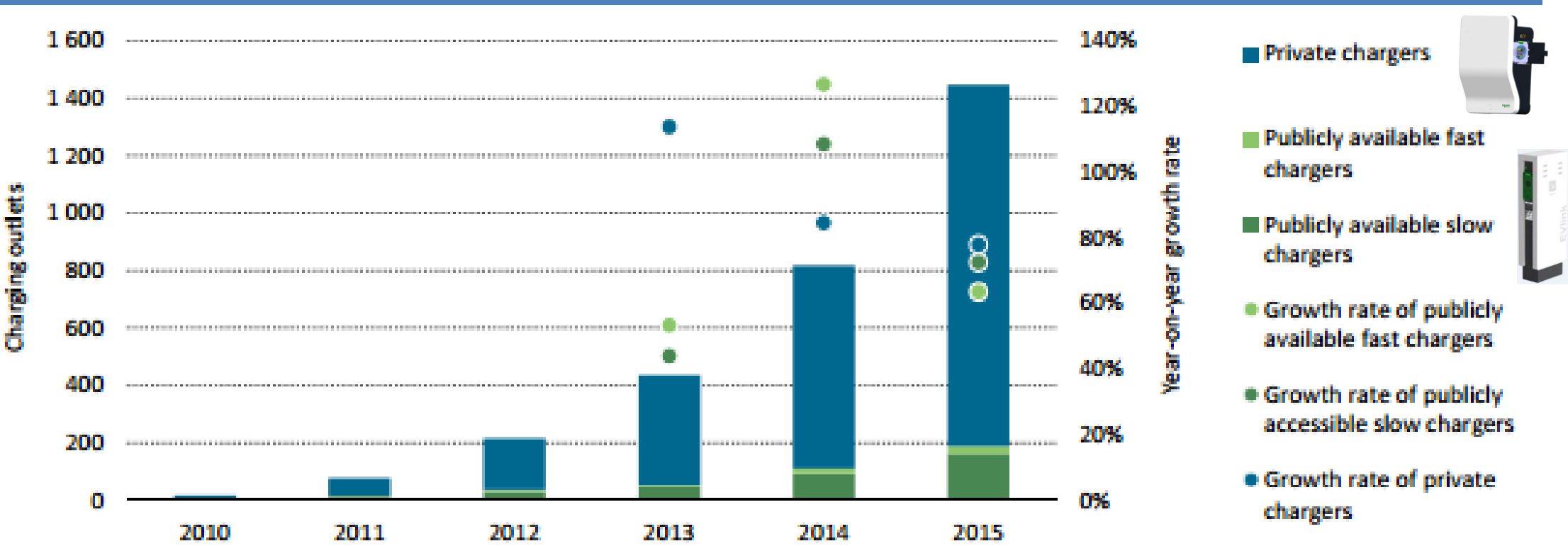


# 1. EVlink Charging Stations

Wallbox – Smart Wallbox – Parking – Fast charge

# Electric vehicle charging places

Figure 11 • Global EVSE outlets, 2010-15



Note: Private chargers are estimated assuming that each EV is coupled with a private charger.

Sources: IEA analysis based on EVI country submissions, complemented by EAFO (2016).

## A reliable product, smarter and sturdier:

### Easy to install:

INSTALLER

- ⇒ 1 person needed (no civil work)
- ⇒ Usual devices and tools
- ⇒ Easy wiring
- ⇒ Adapted weight and volume  
Less than 10kg
- ⇒ Installation < 30min
- ⇒ Compatible with EV simulation tool

### Easy to maintain:

INSTALLER

- ⇒ **Diagnostic display** thanks to HMI leds
- ⇒ Easy access to components
- ⇒ **Spare parts**

IEC standards, CB scheme, and CE marking, ZE ready compliant.

### Safe and robust:

INSTALLER

END USER

- ⇒ adapted recommendations compatible with standard protections
- ⇒ **IP 54**
- ⇒ IK 10
- ⇒ UV resist
- ⇒ **Outdoor use or intensive indoor use**



### Custom made offer:

END USER

- ⇒ Various plug type :
  - ⇒ T3, ACT1, ACT2
  - ⇒ Various power : 3 or 7kW
  - ⇒ T2, T2S, ACT1, ACT2 (4m long)
  - ⇒ Various power : 3, 7, 11, 22 kW
- ⇒ Energy management
  - load shedder
  - Configurable
  - **Power limitation : 16A or 10A**
- ⇒ Power limitation by use of a clock/timer, on/off peak contactor, a load shedder

### Easy to use:

END USER

- ⇒ Plug and charge
- ⇒ Key Lock
- ⇒ Ergonomic
  - ⇒ Cable management
  - ⇒ Easy to see from a short distance – 3m
- ⇒ Friendly look and feel
  - ⇒ Schneider conformity and philosophy
  - ⇒ Smart HMI (mode eco / diagnostic)
- ⇒ Easy to clean
  - ⇒ Withstand to chemicals for cleaning
  - ⇒ Keeps clean when used thanks to surfaces

## A reliable product, smarter and sturdier:

### Easy to install:

- ⇒ Usual devices and tools
- ⇒ Easy wiring
- ⇒ Adapted weight and volume
- ⇒ Compatible with EV simulation tool
- ⇒ New floor base with protection inside
- ⇒ Single connection block to the station

### Easy to maintain:

- ⇒ **Diagnostic display** thanks to HMI leds
- ⇒ Easy access to components
- ⇒ Spare parts

### Safe and robust:

- ⇒ adapted recommendations compatible with standard protections
- ⇒ **IP 54**
- ⇒ IK 10
- ⇒ UV resist
- ⇒ Metal housing
- ⇒ Outdoor use or intensive indoor use
- ⇒ Robust silver socket outlet



### Custom made offer:

- ⇒ Various plug type :
  - ⇒ T2, T2S, TE, TF
  - ⇒ Various power : 7,4 or **22 kW**
  - ⇒ Single or three phase(s)
  - ⇒ **1 or 2 socket(s)**
  - ⇒ Floor standing or Wall mounted
- ⇒ Energy management & Supervision
  - ⇒ load shedder
  - ⇒ Automatic load balancing on the 2 sockets
  - ⇒ Power limitation
  - ⇒ **OCPP 1.5 compliant**

### Easy to use:

- ⇒ Plug and charge
- ⇒ **RFID reader : authentication (badges)**
- ⇒ Ergonomic
  - ⇒ Cable management
  - ⇒ Easy to see from a short distance – 3m
- ⇒ Friendly look and feel
  - ⇒ Schneider conformity and philosophy
  - ⇒ Smart HMI
- ⇒ Easy to clean
  - ⇒ Withstand to chemicals for cleaning
  - ⇒ Keeps clean when used thanks to surfaces

IEC standards and CE marking compliant  
ZE Ready and CB Scheme in progress

## Easy to install:

- ⇒ 1 person needed
- ⇒ Connection to the cloud
  - > By GPRS modem
  - > By ethernet (wired or wifi)
- > OCPP 1.5

## Safe and robust:

- ⇒ Ingress protection : IP 55 or IP54 if provided with a TE socket outlet.
- ⇒ Impact protection : IK10
- ⇒ Operating temperature : -30°C to +50°C
- ⇒ Storage temperature : -40°C to +80°C



## Custom made offer:

- ⇒ Maximum charging current adjustable from 8A to 32A, In 1-Ph (up to 7.4kW) or 3-Ph (up to 22kW)
- ⇒ Connectivity to EV : T2 socket outlet, T2/T2S or attached cable T1 or T2
- ⇒> Key lock or RFID card reader
- ⇒ Energy management capabilities : deferred charging, charging pause and charging current limitation

## Easy to use:

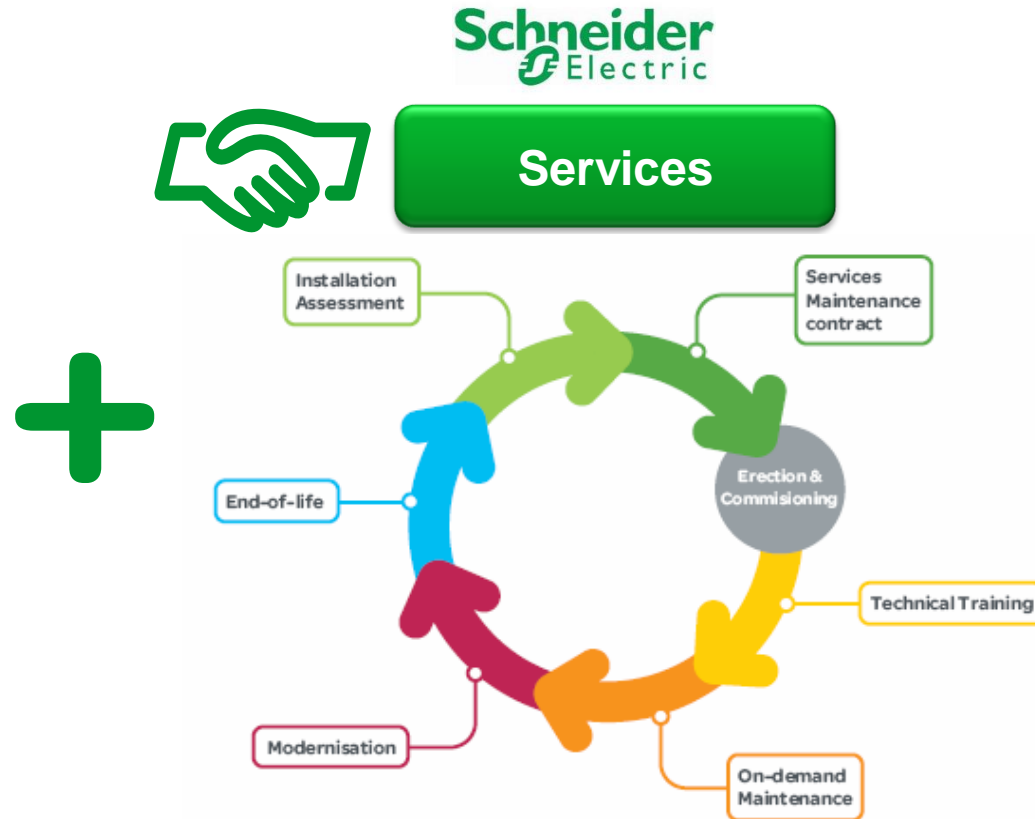
- ⇒ Plug & charge' simplicity
- ⇒ One-touch stop/restart (optional)
- ⇒ Light indicators of charging status

## Easy to maintain:

- Charging station supervision capability
  - > Operate & Maintain your charging infrastructure
  - > Manage access right



## A turnkey solution



1

Logistics & Shipment

2

Installation & Commissioning

3

Maintenance Service Contract

4

Customer Training



## A reliable product, smarter and sturdier:

### Safe and robust :

- ⇒ Quality (IHM screen,...)
- ⇒ Home made software, hardware, mechanic, electronics development
- ⇒ **Protections inside** in the terminal
- ⇒ Operating Temperatures: -30°C to +45°C
- ⇒ Level protection : **IP54**
- ⇒ Mechanical resistance : IK10

### Easy to maintain:

- ⇒ Power modules on a rack
- ⇒ **Default messages**
- ⇒ Direct access on the 4 sides
- ⇒ Online support and diagnostic of status
- ⇒ Online upgrades Hardware and software
- ⇒ Limited maintenance on-site
- ⇒ Heat exchanger on the back
- ⇒ Fully hermetic to air, dust & water, no filters to change



### Technical offer:

- ⇒ **Multi modes: 1, 2 or 3 plugs**
- ⇒ **T2 in AC 43kW, Combo 2 / CHAdeMO 0.9 in DC50kW**
- ⇒ Efficiency rate of 96%
- ⇒ Charge time 15-30mn > 80%
- ⇒ **OCPP 1.5 compliant**
- ⇒ Tested with car manufacturers >300 charging cycles
- ⇒ GPRS communication or Ethernet with server

### Easy to use:

- ⇒ **RFID badges** (Options: SMS, Barcode and Qrcode)
- ⇒ Ergonomics **LCD display** fully visible in sunlight
- ⇒ Access for disabled people
- ⇒ Explicit signage on terminals (Mode and type of charge)
- ⇒ Silent (Low operational noise <60 dB(a) )

### Design:

- ⇒ Compact charging station
- ⇒ Outdoor version
- ⇒ Light weight
- ⇒ Painted stainless steel **customizable**

CE certification with compliance with  
NF C15-100, IEC 61851, EN 62196  
and NF EN 60204-1

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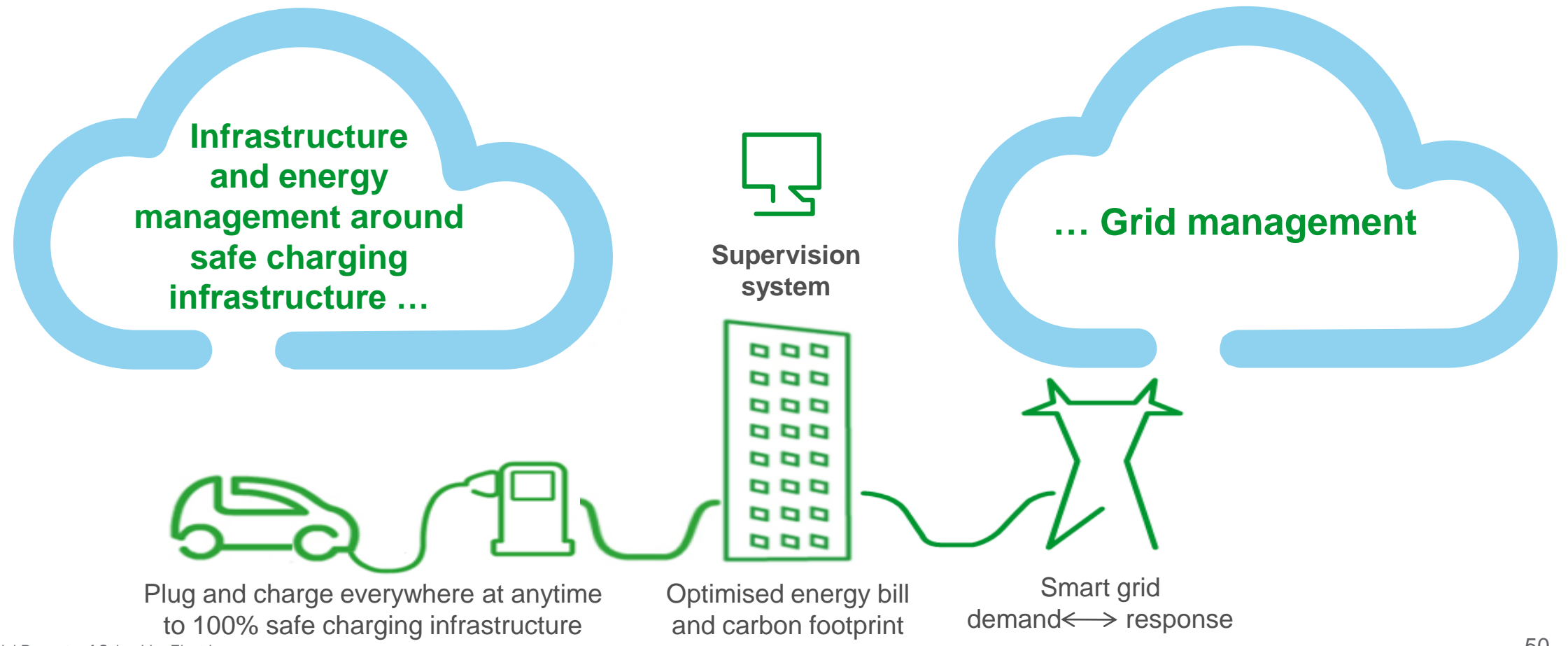
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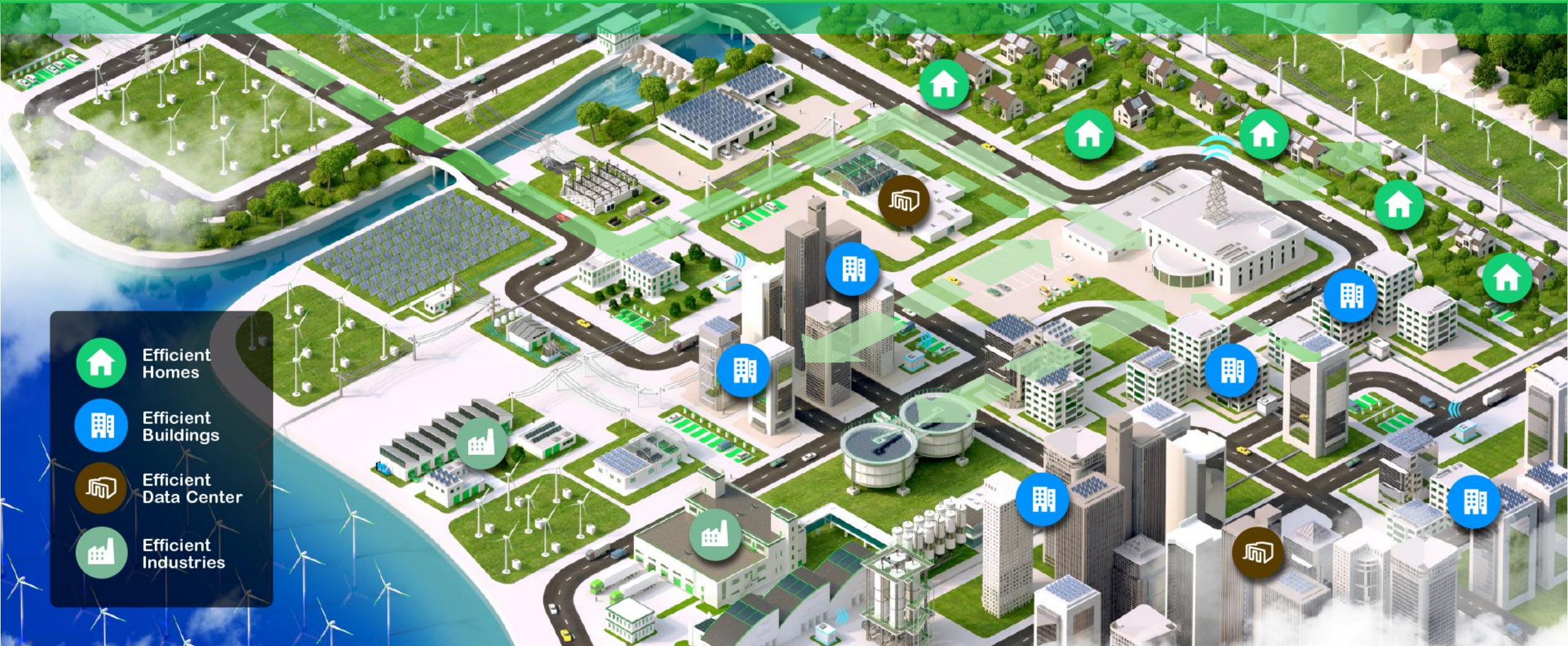
# EVlink Energy management :

## Schneider Electric's answer to face the energy dilemma



# MORE DIGITIZED and MORE DECARBONIZED

Connected from Plant to Plug with demand side active energy and grid efficiency



-  Efficient Homes
-  Efficient Buildings
-  Efficient Data Center
-  Efficient Industries

# MORE DECENTRALIZED

Integrating intermittent generation & leveraging microgrid flexibility

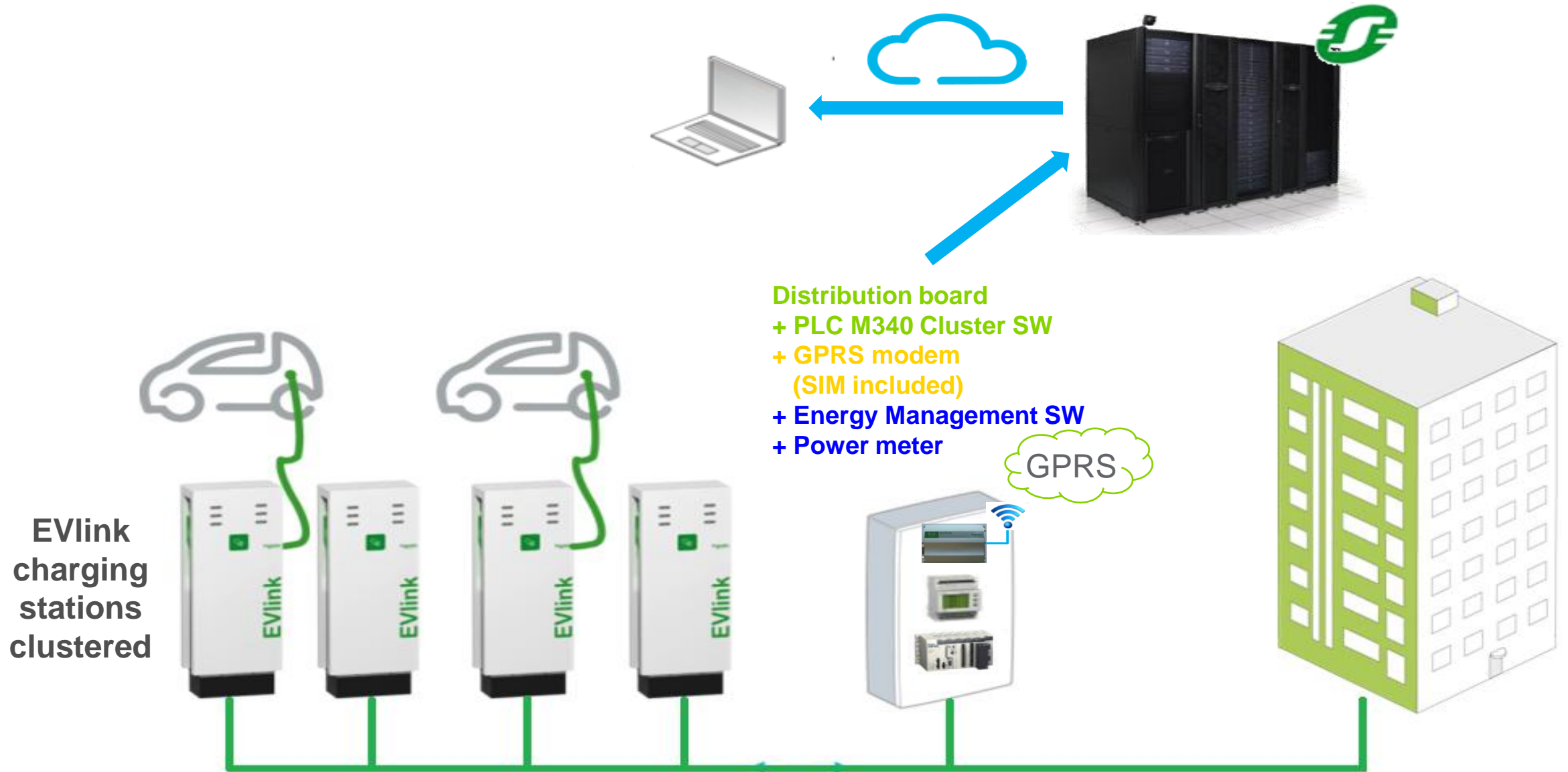


 Distributed Generation

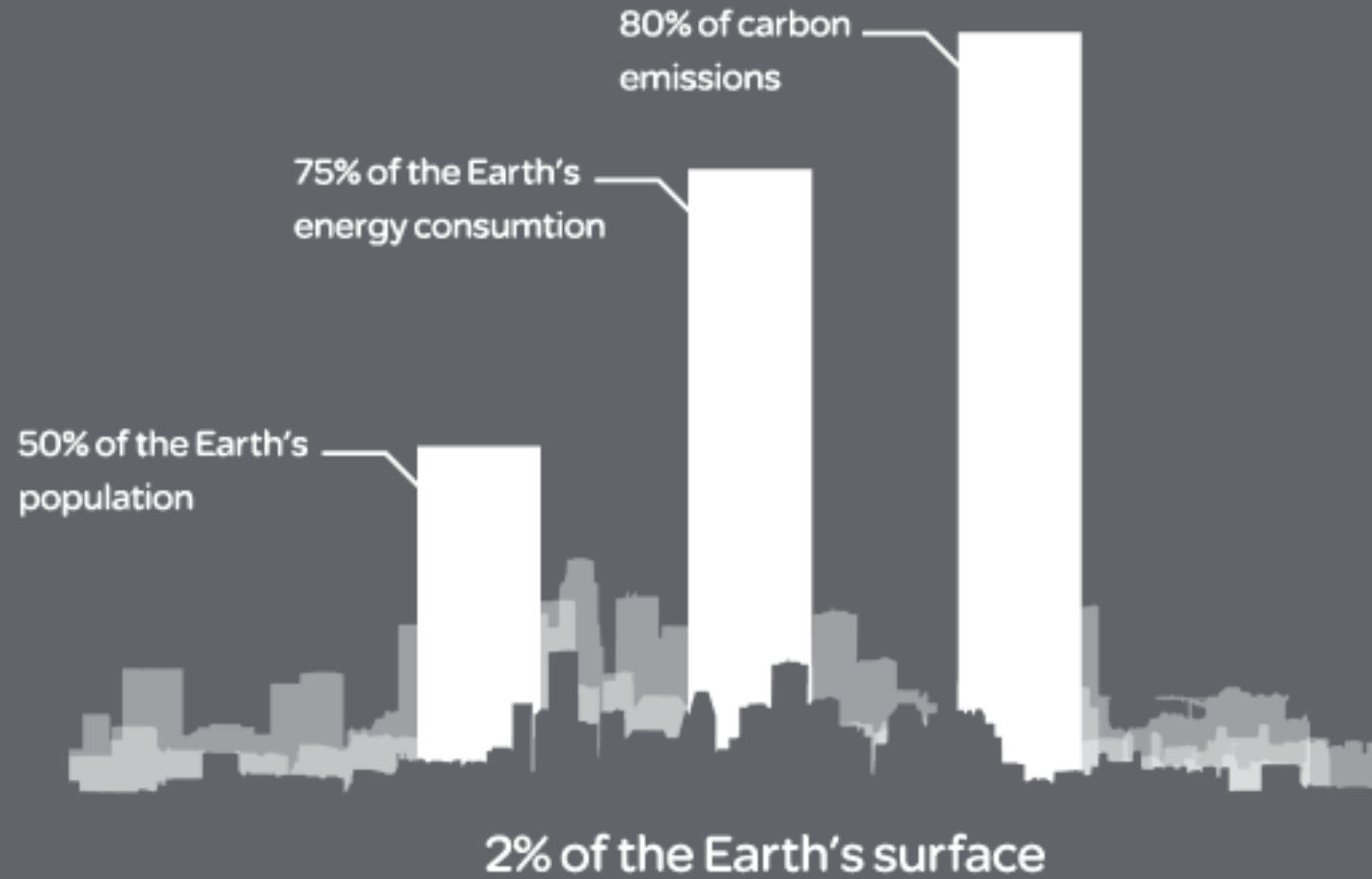
 Energy Storage

 Micro Grid

# EVlink Energy Management Cluster architecture



Orașele noastre cresc  
Our cities are growing.



40% din energia consumată în  
majoritatea țărilor, este consumată în  
**Clădiri**



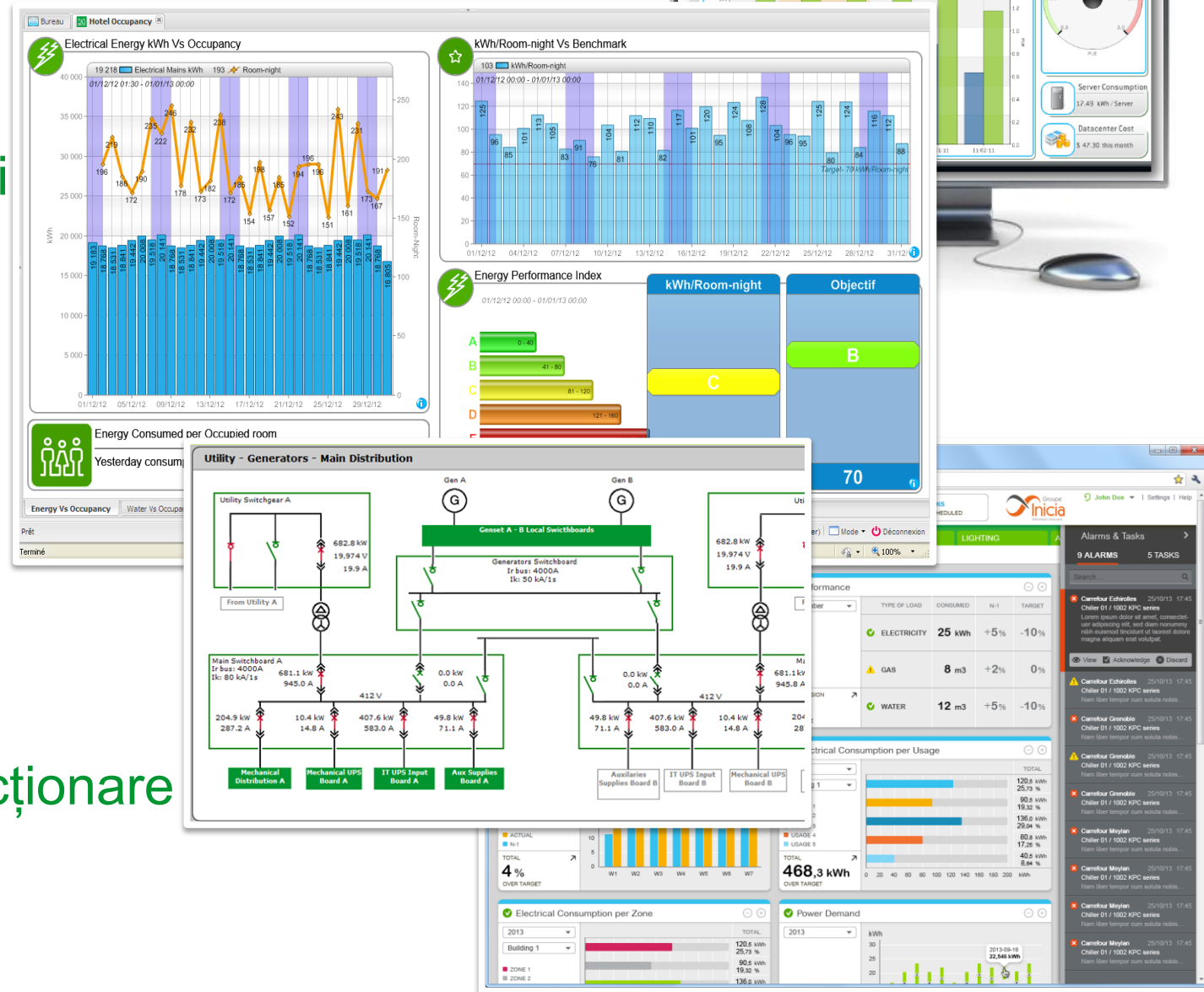
# Mergeți către energia vizibilă!

> **Conștientizarea** utilizatorului

> **Înțelegere:** unde sunt ?

> **Reacție** înainte de  
Apariția problemei

> **Anticiparea** lacunelor de funcționare



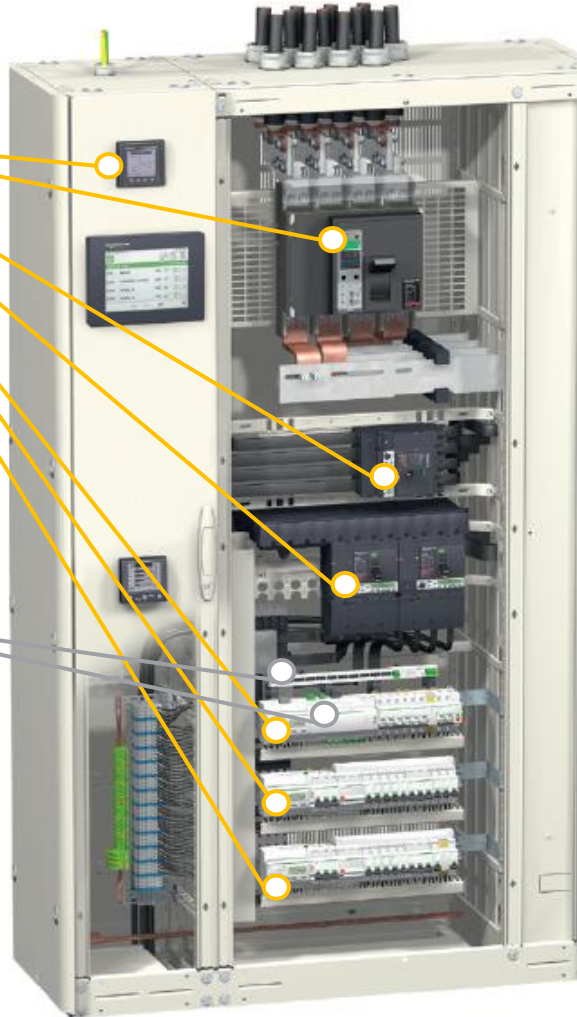


# Smart Panels

## 3 pasi simpli catre Eficienta Energetica & Maintenance management

### 1 Masurare

” Baze de date realizate cu cele mai bune mijloace de masurare ”



### 2 Conectare

” Gama completa de echipamente pentru realizarea unei arhitecturi adecvate ”



### 3 Economisire

” Solutii flexibile si accesibile in conformitate cu cerintele cladirii ”

#### Cladiri mici si mijlocii



Management basic de energie si operare a cladirii



Display local, Pagini Web incluse



#### Cladiri mici si mijlocii



Control simplu de iluminat si HVAC



Software inclus in Spacelynk sau Smart StruXure lite



#### Cladiri mari/Premium

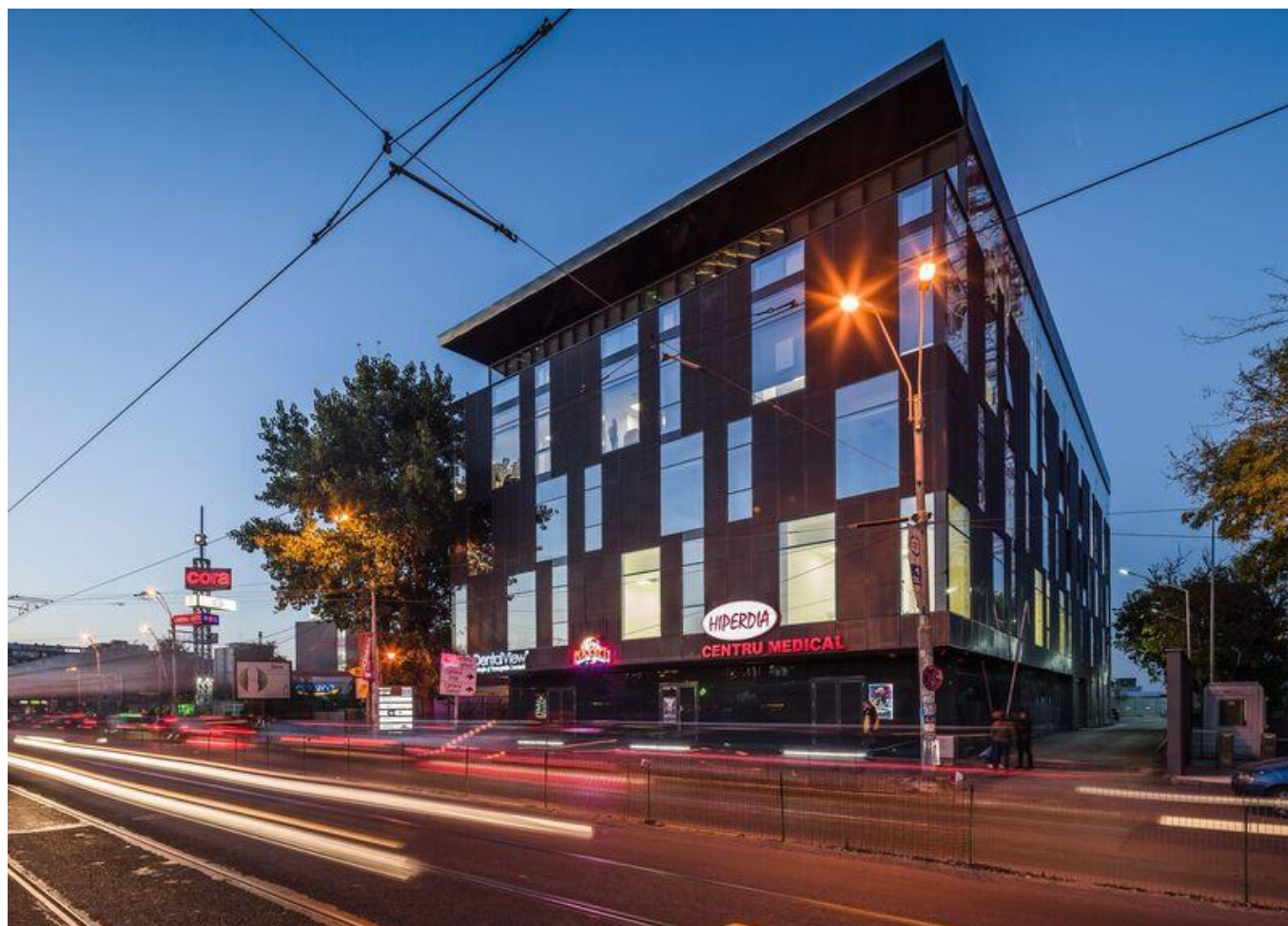


Management avansat de energie si operare a cladirii



SmartstruXure Building Operation sau Power Monitoring/Scada Expert





Referinta in Romania:

**Big Office**

Sos. Oltenitei nr. 87-99

Life Is On

**Schneider**  
Electric

# Controlul si comanda circuitelor de iluminat cu LED

# Problematika iluminatului cu LED

## > Piata LED-urilor

- > **13,6 miliarde \$** in 2014
- > Asteptari: **63,1 miliarde \$ in 2020**
- > In 2015 **50%** din lampile de pe piata sunt LED

## >LED – curenti specifici de varf la initierea aprinderii

- > Valori de varf foarte mari → pana la **200x** curentul nominal
- > Durata **< 1ms**



Potentiala problema pentru utilizatori:  
**declansari nedorite ale protectiei la inchiderea circuitelor**

# Solutie dedicata marca Schneider Electric

> Leclerc Blagnac solicita Schneider Electric o solutie !

> **Nici un impact in tablouri dpdv spatiu**

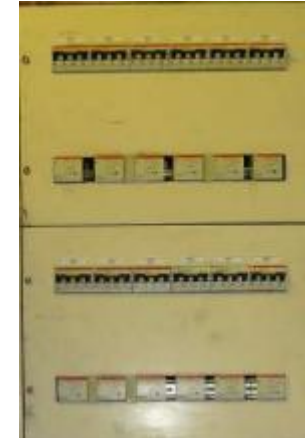
- Injumatare a nr. de circuite datorita puterii reduse a lampilor cu LED

> **iCT+ & iTL+** reprezinta solutia SE la problema clientului

> **Tehnologie 0-crossing incorporata**

- Cu ajutorul unui circuit electronic inclus, aparatul detecteaza trecerea prin zero a tensiunii si inchide circuitul in acel moment
- Se elimina declansarile intempestive ale intreruptoarelor automate

> **Potrivite pentru orice aplicatie de iluminat cu LED**



Inainte



Dupa



iCT+

# Solutia Schneider Electric pentru tablourile de salii de operatie

Life Is On



## Tablouri de distribuție electrică sigure pentru blocurile operatorii

### Conformitate cu standardele

Soluții pentru blocuri operatorii	IEC 60364-7-710
Tablou electric	IEC 61439-1 și -2
Transformator de izolare	IEC 61558-2-15
Supraveghere continuă a izolației	IEC 61557-8
Compatibilitate electromagnetică	IEC 60364-4-44 IEC 61000-6-2 și -3



Prisma Plus - Sistem P

Life Is On

**Schneider**  
Electric

**Certified**  
ISO 9001:2008, ISO 14001



Energy Management Solutions

# Manufacturer declaration of Solution Performance

**Designation:**

**Hospital Energy Management Solutions**

**Version:**

Insulated Panel System

**Applications**

Power supply of Operating Theatre and Intensive Care Units

**Partner**

**End user**

Life Is On





# Solutiile Schneider Electric

## Instrument de calcul al economiilor de energie: ECO2



- Estimari bazate pe caracteristica de functionare a motorului si pe ciclurile sale de lucru

### • Foaie de rezultate:

- Consumul de putere cu si fara variator de viteza
- Economii realizate
- Perioada de recuperare a investitiei
- Grafice

# Oferta SE de variatoare de viteza – Joasa si Medie tensiune

