



From Smart Grid to Smart City

EXPO Milano 2015 Best Practice

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Boston



Enel Today

Global Energy Networks



Enel Group

Capacity: 89.7 GW
End users: 61.2M

1.9

Mln km of lines

414

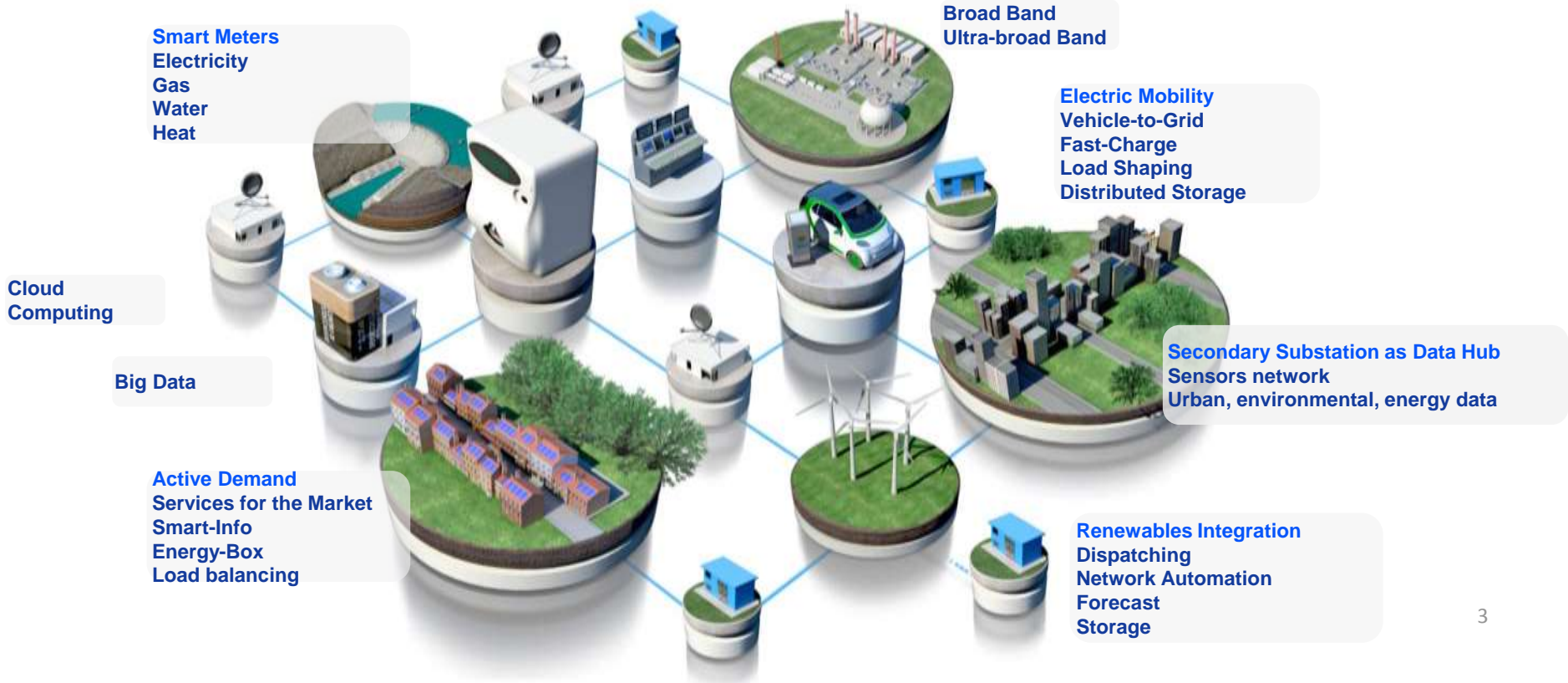
TWh Distributed Energy



Presence with operating assets
Presence with Dx assets

Distribution System Operator as enabler

Energy Networks, Utilities and Urban Services



Enel Smart Cities

Projects in Italy, Spain, LATAM



Ciudade Inteligente Búzios

(2011-15, total budget 18,6 M\$)

More than 10,000 smart meters, led lighting, energy efficiency and customers awareness programme.



Santiago Smart City

(2012-16, total budget 5,6 M\$)

Smart metering, smart home automation, water solar heating, PV generation, electric massive transportation, free Wi-Fi. Aimed to be "Smartest City in Latin America".



Barcelona GrowSmarter

(2015-19, total budget 25 M€)

Horizon 2020 funding: Energy Management e Low energy District projects, V2G and fast recharge e-mobility pilot initiatives.



EXPO Milano 2015

(2014-15, total budget 33,5 M€)

Genoa Transform

(2013-15, total budget 7,8 M€)

Smart urban planning methodology study funded under FP7 programme.



Smart City Málaga

(2009-13, total budget 31 M€)

Energy efficiency and RES integration: 20% of energy saving target fulfilled.



Barcelona Smart City

(2011-14, total budget 2 M€)

More than 1M smart meters.

L'Aquila Smart City

(2013-16, total budget 16,3 M€)

A brand new smart electric infrastructure for the city after 2009 earthquake: network automation, e-mobility, led lighting.



Bari and Cosenza RES NOVAE

(2012-15, total budget 24 M€)

The project involves activities aimed at research, modeling and experiment on demonstration scale a complex and dynamic system of advanced management of energy flows at the municipal level.



Florence REPLICATE

(2016-20, total budget 29 M€)

Horizon 2020 funding: ICT integrated systems for e-mobility, energy efficiency, smart water management and waste collection.





Official Global Partner
EXPO
MILANO 2015
1 MAY - 31 OCTOBER

EXPO Milano 2015 has been the first greenfield Smart City for 100,000 people in the World. Powered by Enel.

EXPO Smart City

Enel Technologies



GRID TECHNOLOGIES



SMART METERING SOLUTION



ACTIVE ENERGY MANAGEMENT



RENEWABLE SMART MANAGEMENT



SMART SUBSTATIONS



ENERGY STORAGE SYSTEMS



OPERATION CENTER

SMART LIGHTING



ARCHILEDE HIGH PERFORMANCE



SMART OUTDOOR LIGHTING SOLUTIONS



ARTISTIC MULTIMEDIA & DESIGN LIGHTING

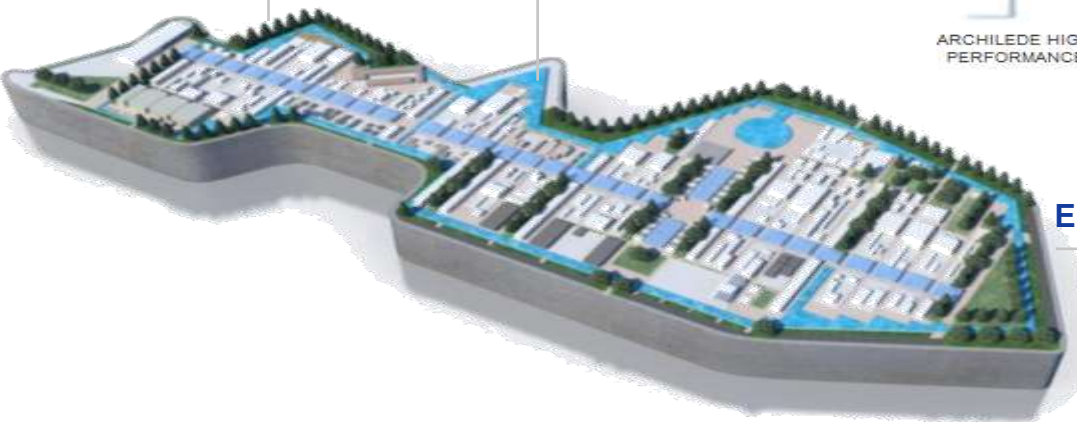
ELECTRIC MOBILITY



LIGHT E-MOBILITY



ELECTRIC MOBILITY



EXPO Smart City

Facts and Figures

- Innovative **automatic grid control** and **fault detection systems** for electricity distribution network management (**75MW are required**)
- **100 MV substations** for pavilions
- **Storage System** and integration of **RES**
- **EMS** for Pavilions and Palazzo Italia
- **8,500 LED** lighting fixtures
- **100 recharging stations** for EV
- **Operation Centre** to monitor and control all the electrical infrastructures: **interactive multimedia contents** available both at Enel Pavilion and at Smart Grid Lab Milano Rubattino



Energy Management System (EMS)

Energy monitoring and forecasting



Electric Mobility Management system (EMM)

Charging process supervision and control



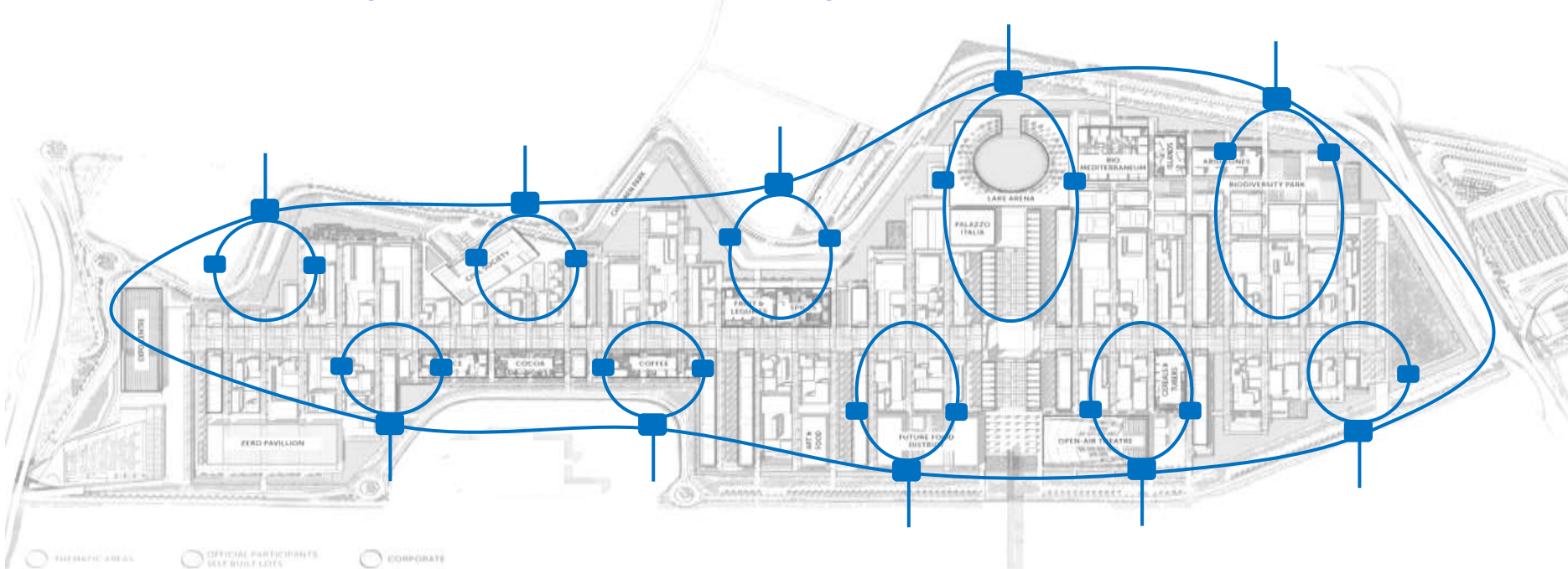
Street Lighting Remote Control (ArchiLEDe)

Luminous flux regulation

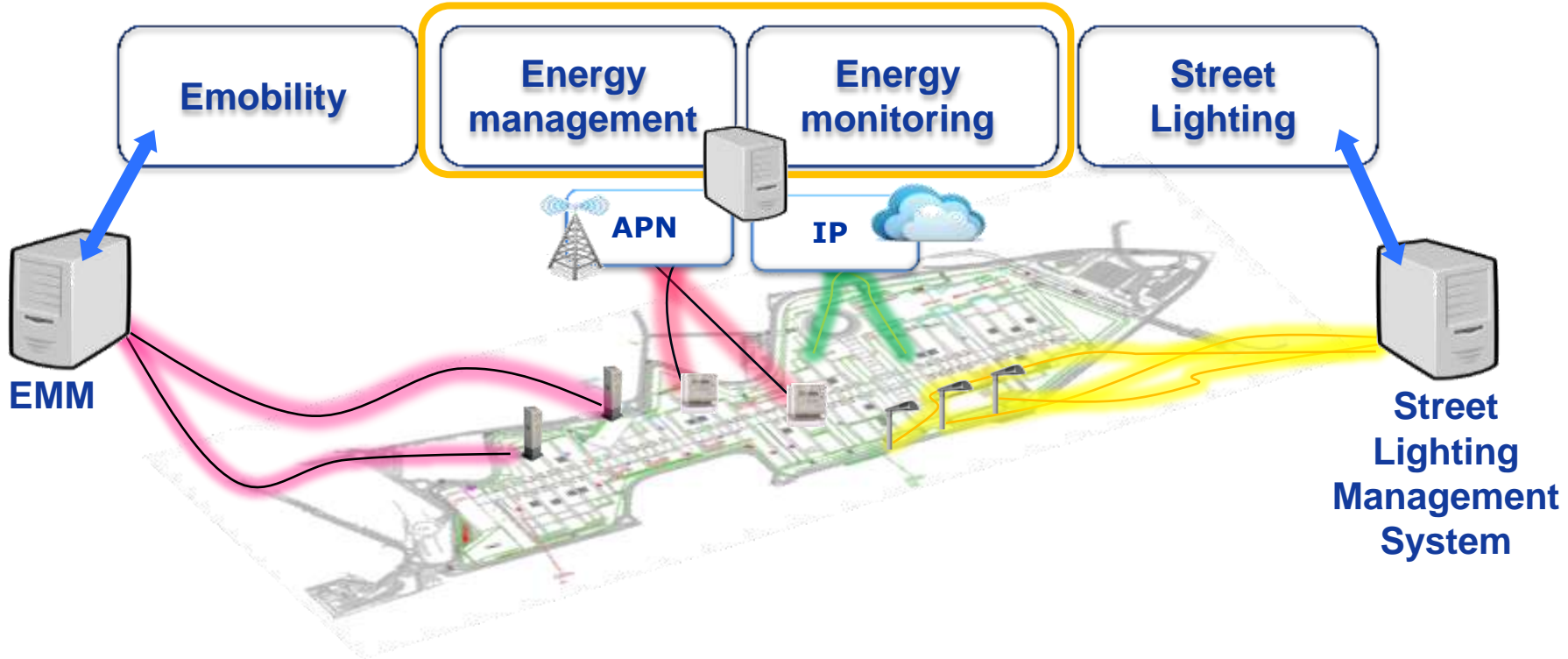
The Smart Grid



The services provided by Enel Distribuzione allow the Pavilions to be completely integrated with the meshed configuration of EXPO Smart Grid



Remote Control Systems

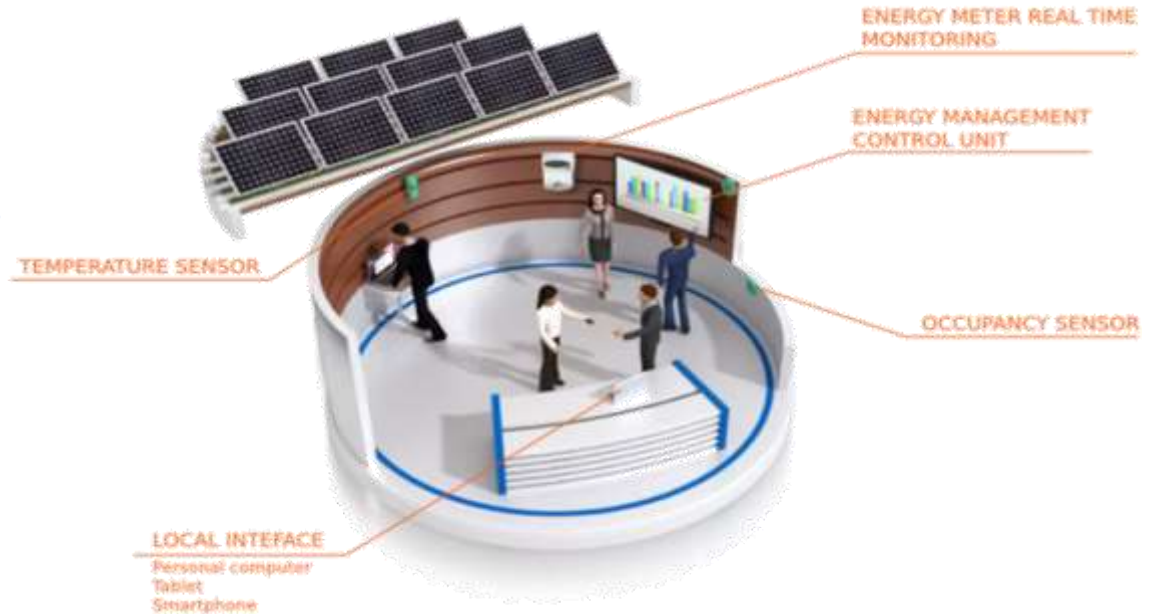


Energy Management System



Monitoring, management and control of comfort (HVAC - Heating, Ventilation and Air Conditioning) and electrical loads

Smart management of energy produced by renewable power plants



Energy Management System

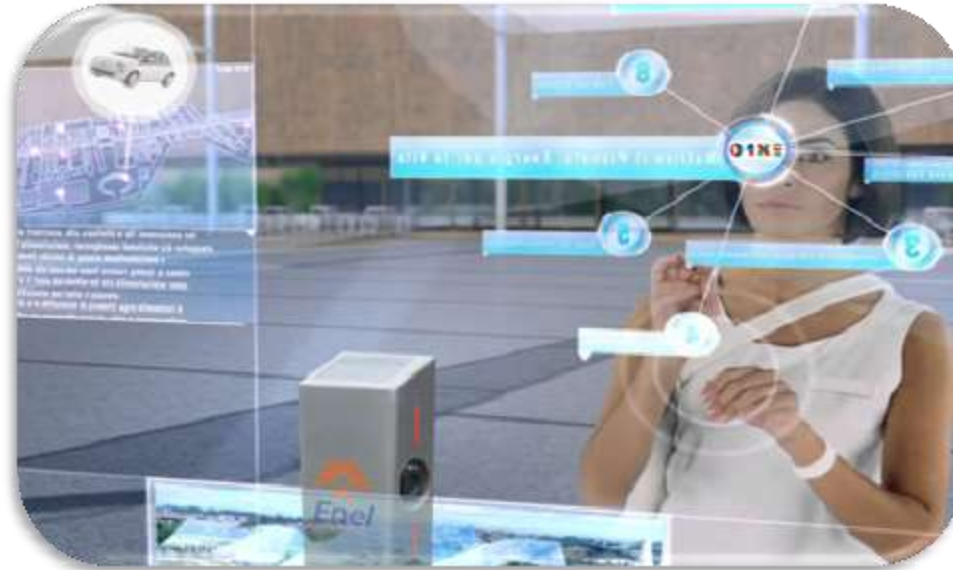


The screenshot displays the EMS (Energy Management System) interface. At the top, it shows the logo 'EMS' and the text 'Operation Center for Smart Grid Energy Management'. A navigation bar includes 'Home', 'Things', 'Assets', 'Active Demand', 'Reporting', and 'Administration'. The main content area is titled 'EXPO > Cereals & Tubers Area > Qatar'. It features a 3D architectural rendering of a building complex. To the right of the rendering, there are two data panels: 'Energy' showing '4,009 kWh Consumption' with a downward arrow, and 'Services' showing '24 °C Temperature' with a leaf icon. A vertical sidebar on the left contains navigation options: 'Geographical', 'Electrical', 'Technical', 'Events', and 'Things', with an 'EDIT' button at the bottom. The top right corner includes logos for 'Enel' and 'SIEMENS' along with a note about a strategic partnership for Expo Milano 2015.

Smart Mobility



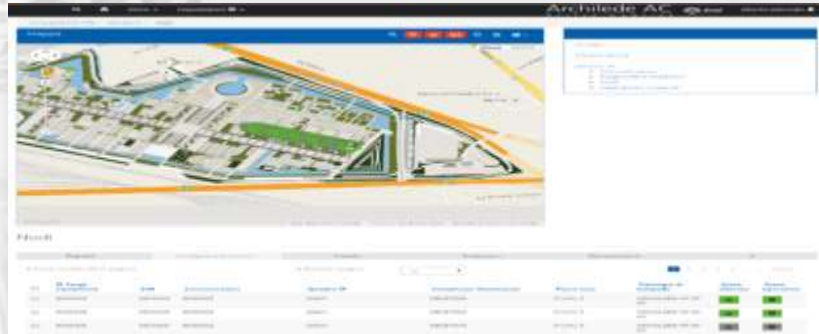
100 charging stations with remote control installed.



Smart Lighting



Design and supply of 8500 remote controlled lighting points



Significant energetic saving and equipment management with high efficiency (LED) and fine tuning (TLC)

Project Governance and Stakeholders



STAKEHOLDERS



OFFICIAL GLOBAL PARTNERS



PARTICIPANTS






-20.761 t CO₂

 **-25%**

service interruptions

 **-45%**

service interruptions duration



SMART ENERGY AND LIGHTING GRID



+5 %

renewable energy

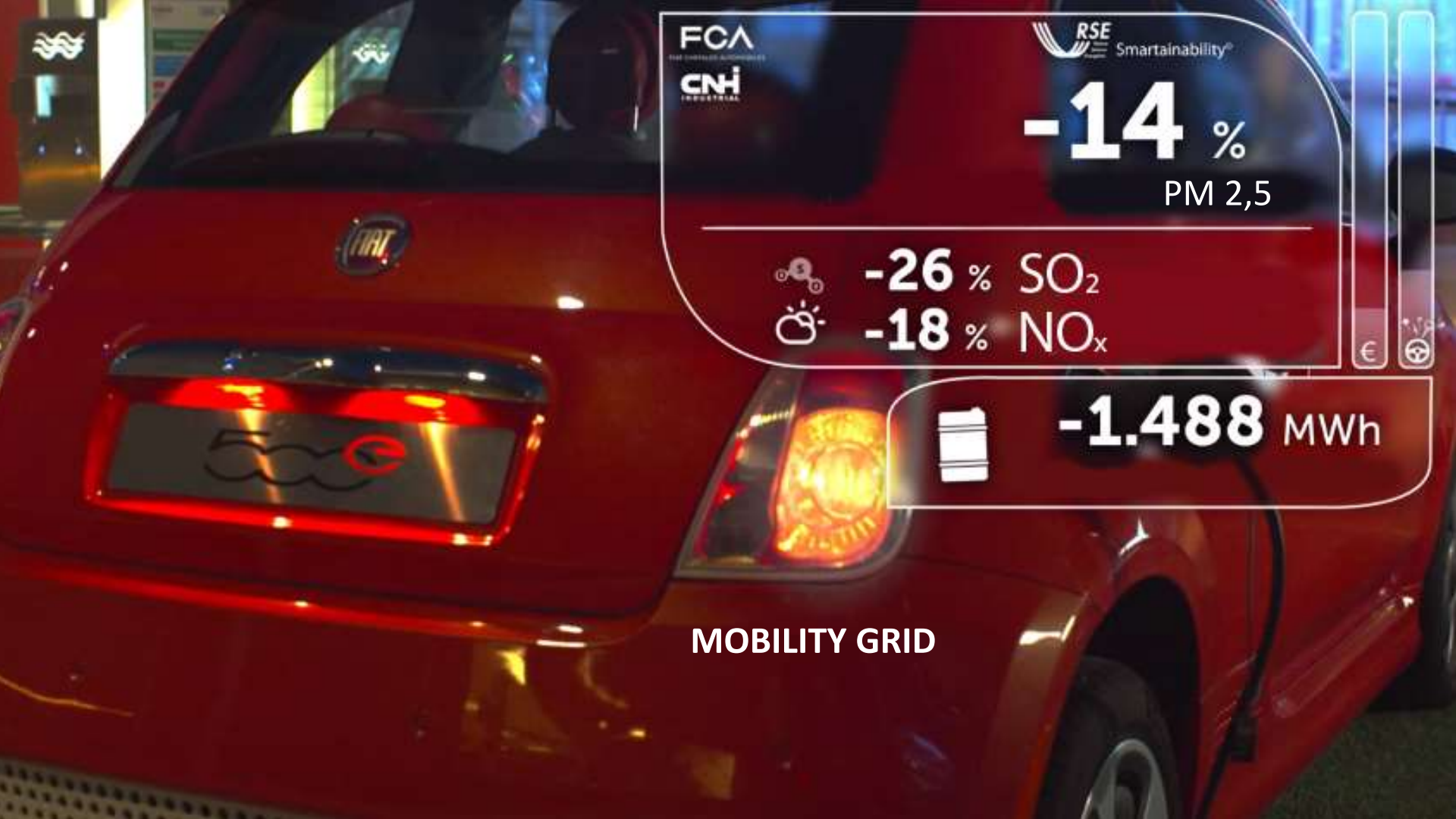


-838.843 €

CO₂ -702 t CO₂

-2.306 MWh

SMART CONNECTIVITY GRID



FCA
FINANCIAL CORPORATION
CNH
INDUSTRIAL

RSE
Smartainability®

-14 %
PM 2,5

 **-26 %** SO₂
 **-18 %** NO_x



-1.488 MWh

MOBILITY GRID



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Thank you!

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