

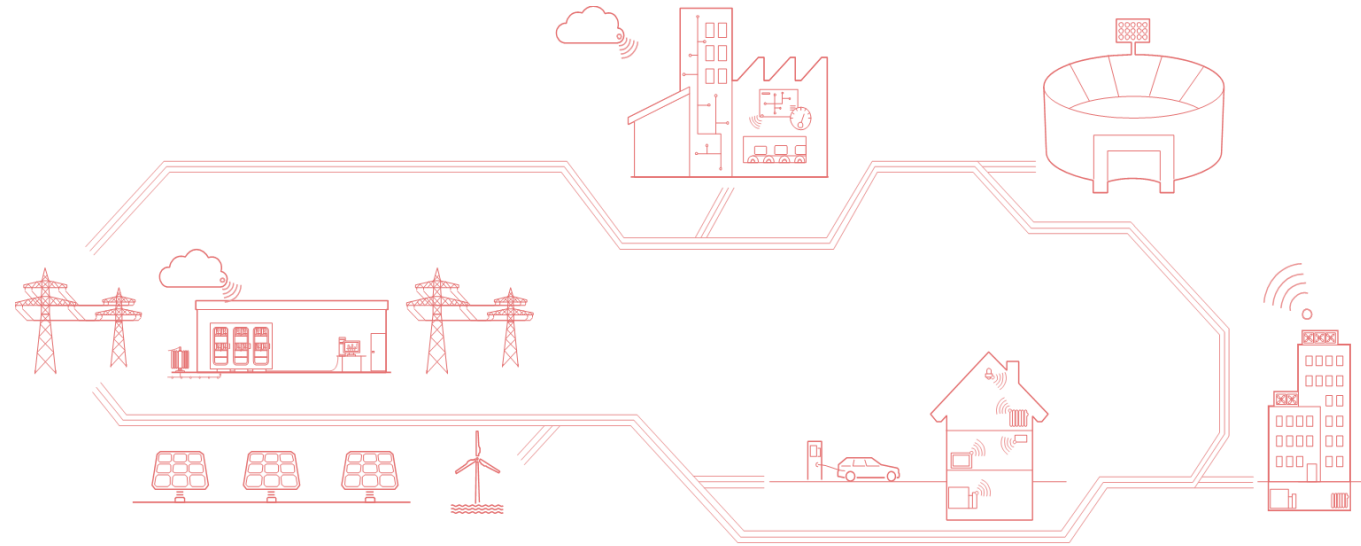


April 16, 2019, Bucharest

# Future transportation and infrastructure electrification

Constantin Ichimoaei – Executive Manager

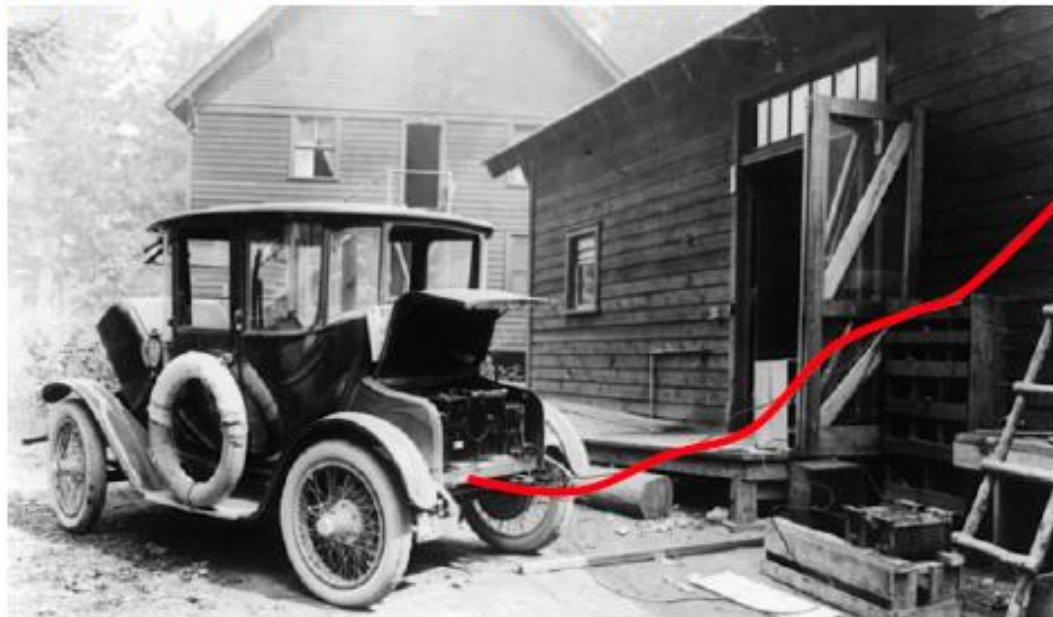
# Electrification Products



**Partner of choice for safe, smart and sustainable electrification**

# E-mobility?

It is all about a new mindset



Charging in 1911  
Old stuff!

*„I believe in the horse. The automobile is only a temporary phenomenon.“*



Kaiser Wilhelm II.

Bundesarchiv, Bild 135-90242  
Foto: Telgmann, Oscar I. 1913



# Megatrends shape the future



## Urbanization

70% of the world's population will live in cities by 2050<sup>1</sup>

UN study



## Digitalization

By 2020, 33bn+ internet-connected devices will be used worldwide<sup>2</sup>

Strategy Analytics study



## Integration of flexible supply

The solar market will grow to 150 GW in 2025

Frost&Sullivan



## Integration of flexible demand

EVs will represent over 55% of the market by 2040

Bloomberg



# What does it take to get to zero emissions?

1

**Electric vehicles must be available**



2

**We need to be able to charge our electric cars**



3

**We need to reinforce the grid**



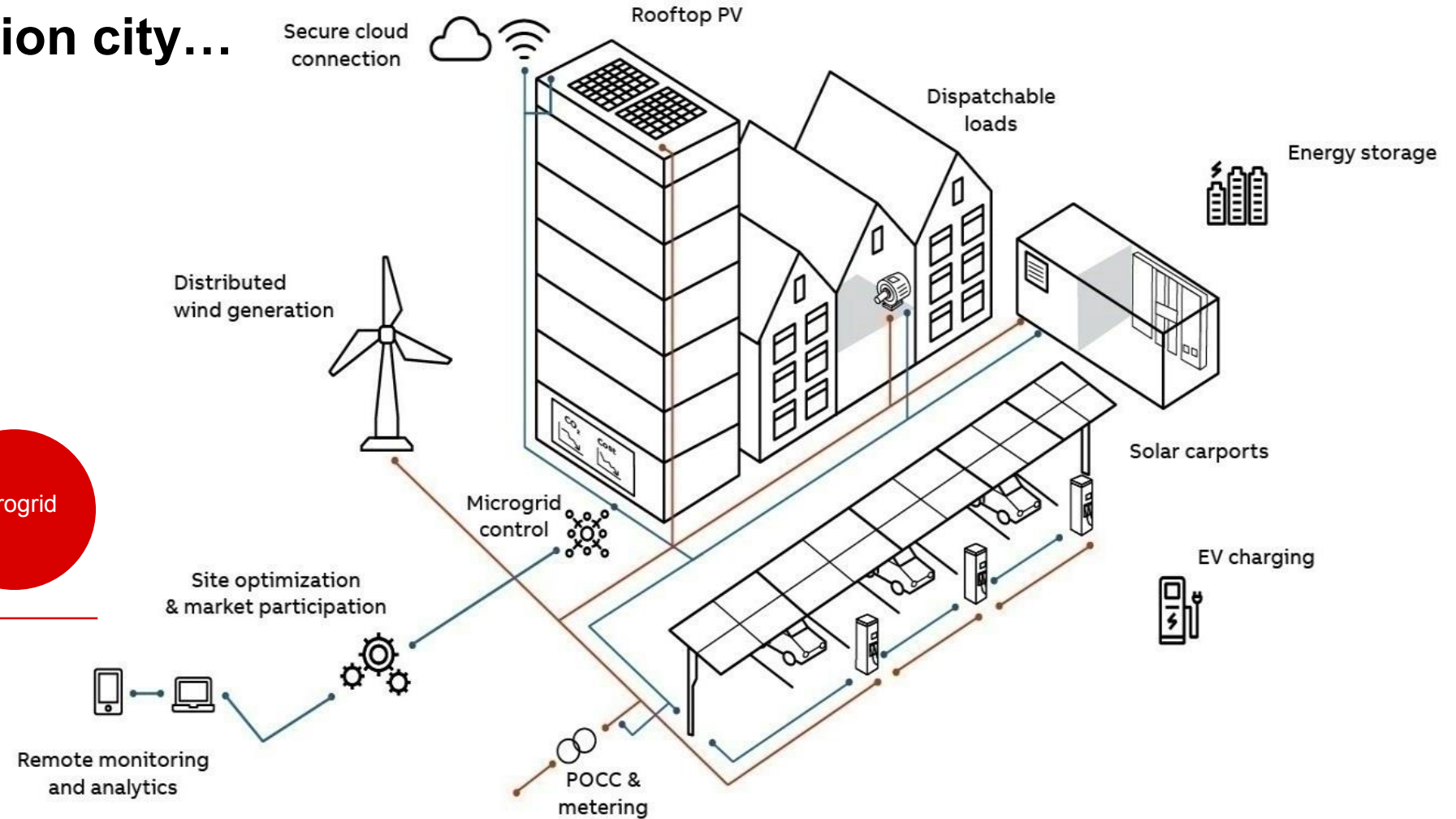
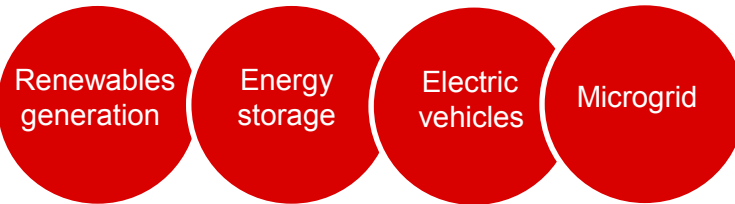
4

**Integrate renewable power generation**



# Imagine a zero emission city...

Residential and commercial customers and communities become active participants in the energy revolution by optimizing local resources



Consumers become prosumers: from homes, to commercial buildings to cities

## The future is Electric

Autonomous electrical cars, buses, trucks, trains and vessels will change the world



The Stone Age did not end for lack of stone, and the Oil Age will end long before the world runs out of oil.

— *Ahmed Zaki Yamani* —

AZ QUOTES



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# Innovation in action: opening of the first public CCS chargers in the world

First in Europe and the Americas

**VW/Wolfsburg and BMW, June/July 2013**



**GM & BMW in San Diego, September 2013**

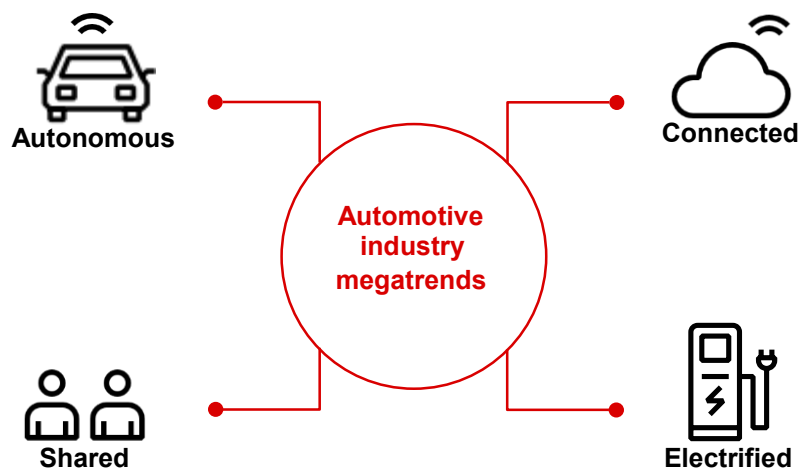




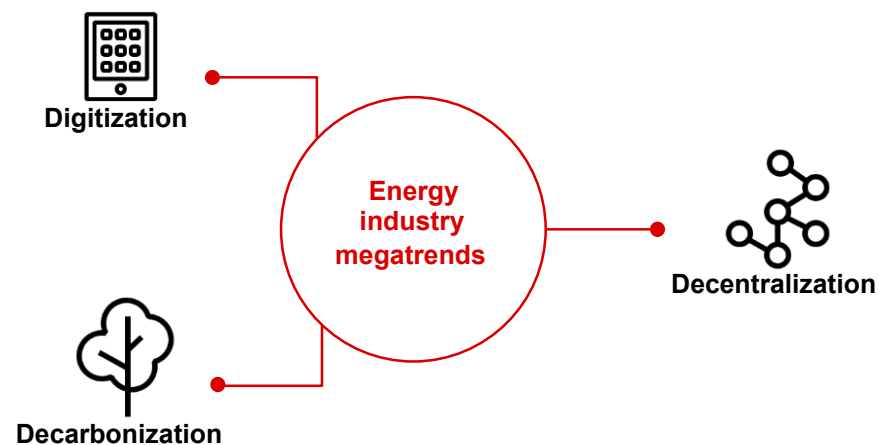
# Disruptive trends are currently re-shaping the mobility and the energy sector

Overlapping trends

## MOBILITY system: A-C-E-S



## ENERGY system: 3D



Fundamental drivers for mobility and energy: technology developments, societal and environmental trends, and customer behavior.

# Challenges for the industry

## Challenges

Acceptance level of EV's for Drivers / Fleets

- Range anxiety
- Charging times
- Charging convenience & accessibility

For Operators

- Up-Times
- Serviceability
- Utility / Grid-codes / permits

For OEM

- Disruptive shift
- Technical (standards; EMC; insulation;....)
- New business models

## ABB as a partner

Global Player, native in over 100 countries

Front-runners in High-Power Charging, over 600 patents in power-conversion and charging

Leading development of key components for HPC with industry suppliers

Field experience from installed base and thousand of service engineers; since 2015 only more than 100 GWh charged in ~ 15 Mio charge sessions

Highly interoperable with all EV models and with more than 50 different backends

Seamless grid integration from single 50kW to multiple output 350kW charging parks

# The charging infrastructure





# Driver: The EV range roadmap

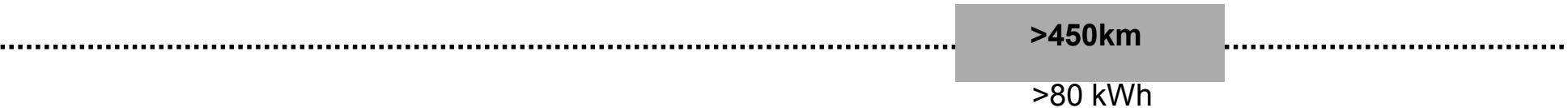
Batteries get bigger, range gets longer

2011    2012    2013    2014    2015    2016    2017    2018    2019    2020    2021

## Mass market EVs



## Premium EVs



Small cars:  
50 - <150 kW



Mid/ high segment:  
120 - 150 kW



Top segment:  
~300/350 kW



# Charging infrastructure key for mass-adoption of EVs

EV charging market can be split in 4 segment applications

## AC destination private/commercial

Power: 3 – 22 kW

Charging time: 4 – 16 h



## DC destination (semi-)public (slow))

20 – 25 kW

1 – 3 h



## DC fast (fuel stations)

$\geq 50$  kW

20 – 90 min



## DC high power & bus charging

150 – 350kW+

10 – 20 min



# Public and commercial car charging – use cases

Charging service should match charging application and demand

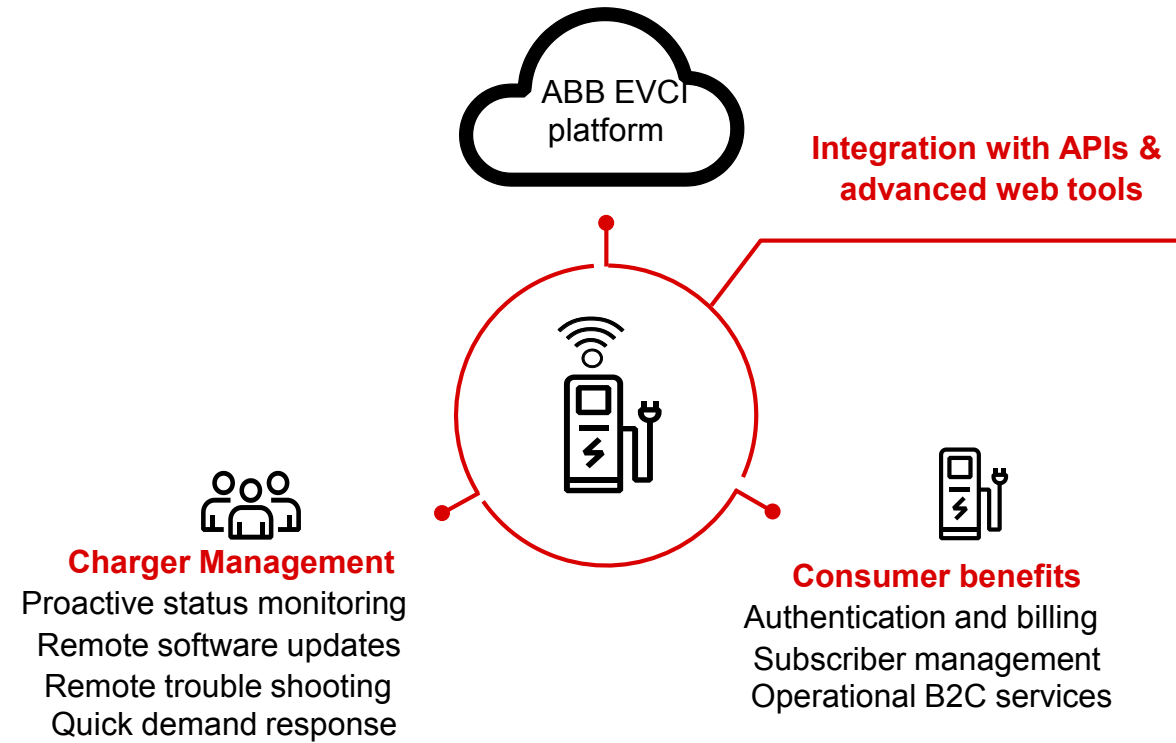
Public and commercial EV charging			
AC destination	DC destination	DC Fast	DC High Power
3 – 22 kW	20 – 25 kW	≥ 50 kW	150 – 350kW+
4 – 16 h	1 – 3 h	20 – 90 min	10 – 20 min



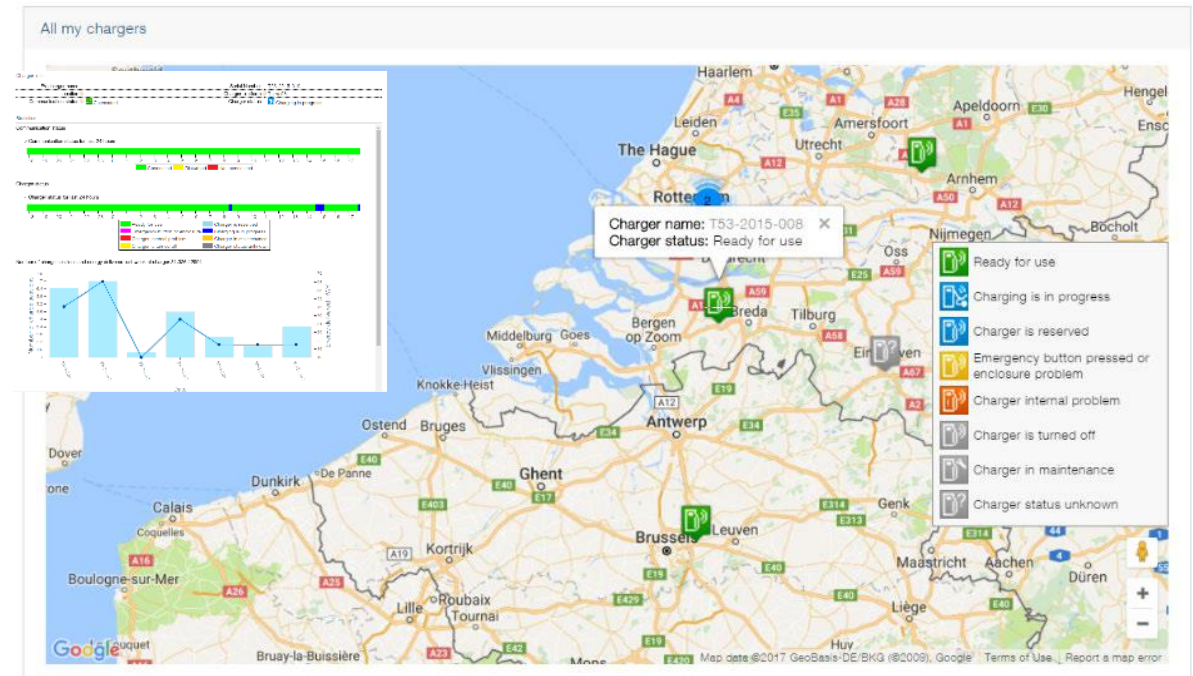


# ABB e-mobility portfolio

Smarter mobility - cloud based reliable and cost-effective fast charging services with ABB Ability



## Web tool - real time monitoring and configuration

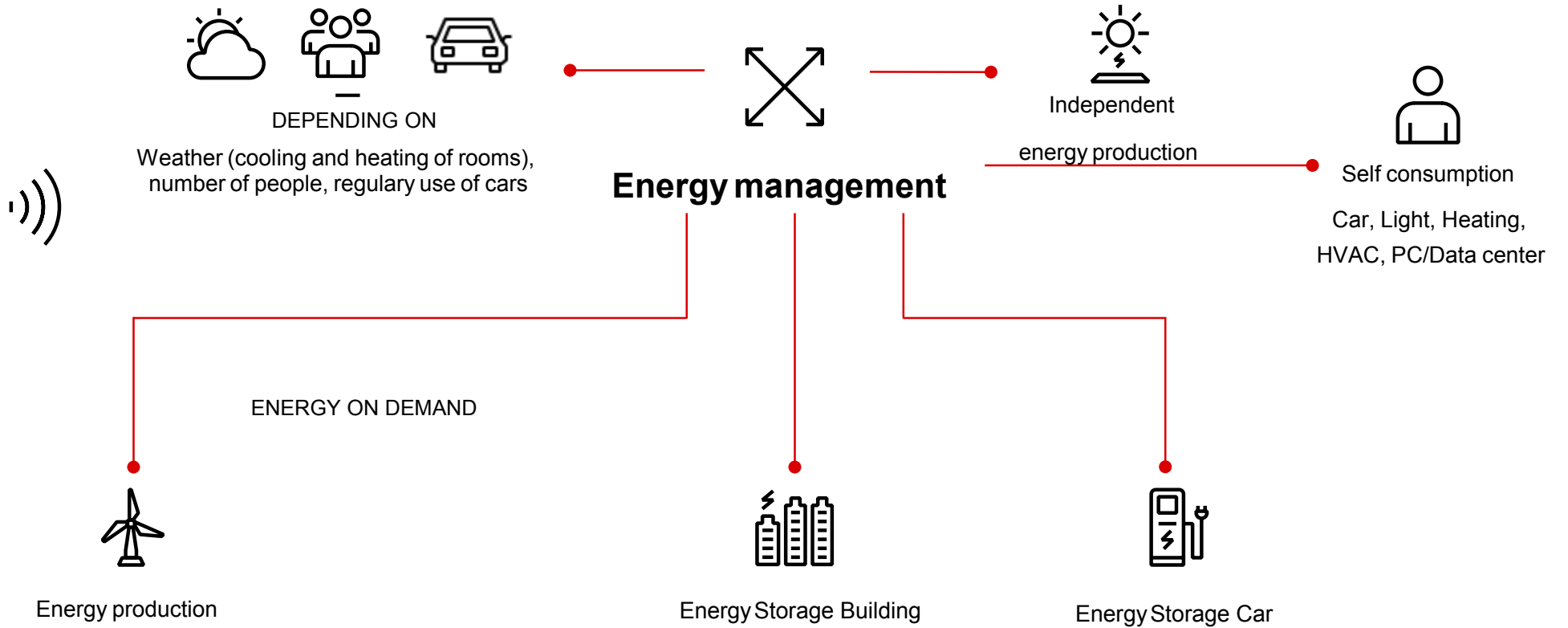


# Energy- and load management

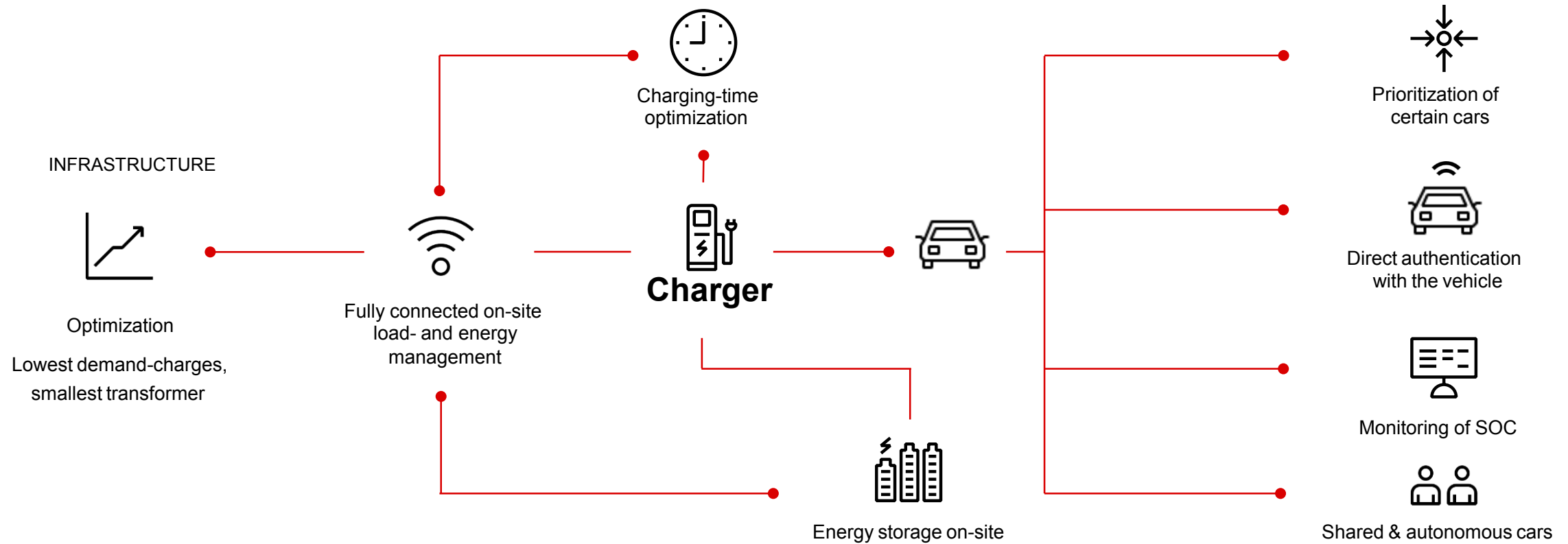
Energy management and integration of renewables

## ABB Ability™

For purchasing and control by  
owner or 3rd Party

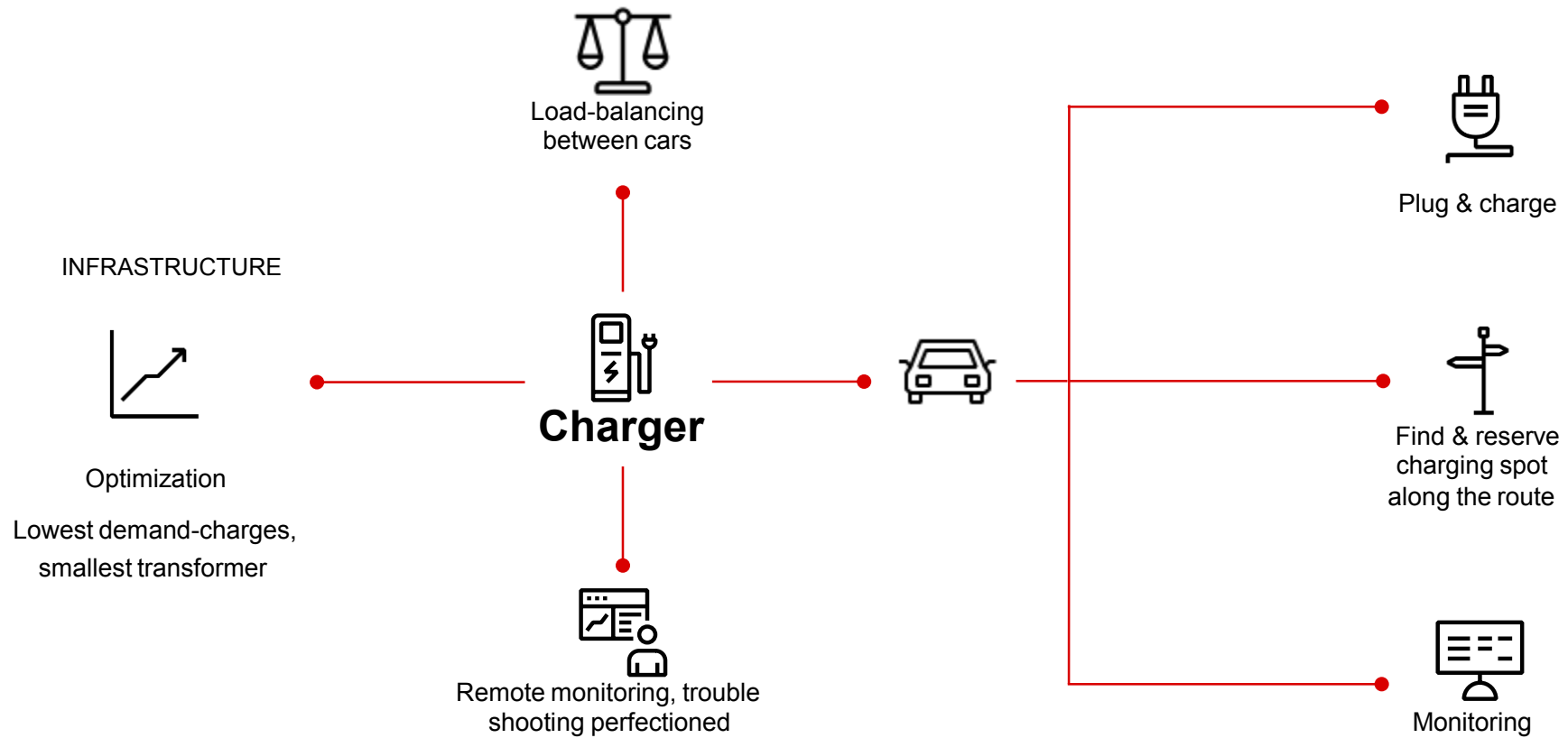


# Future use case “charging at destination”

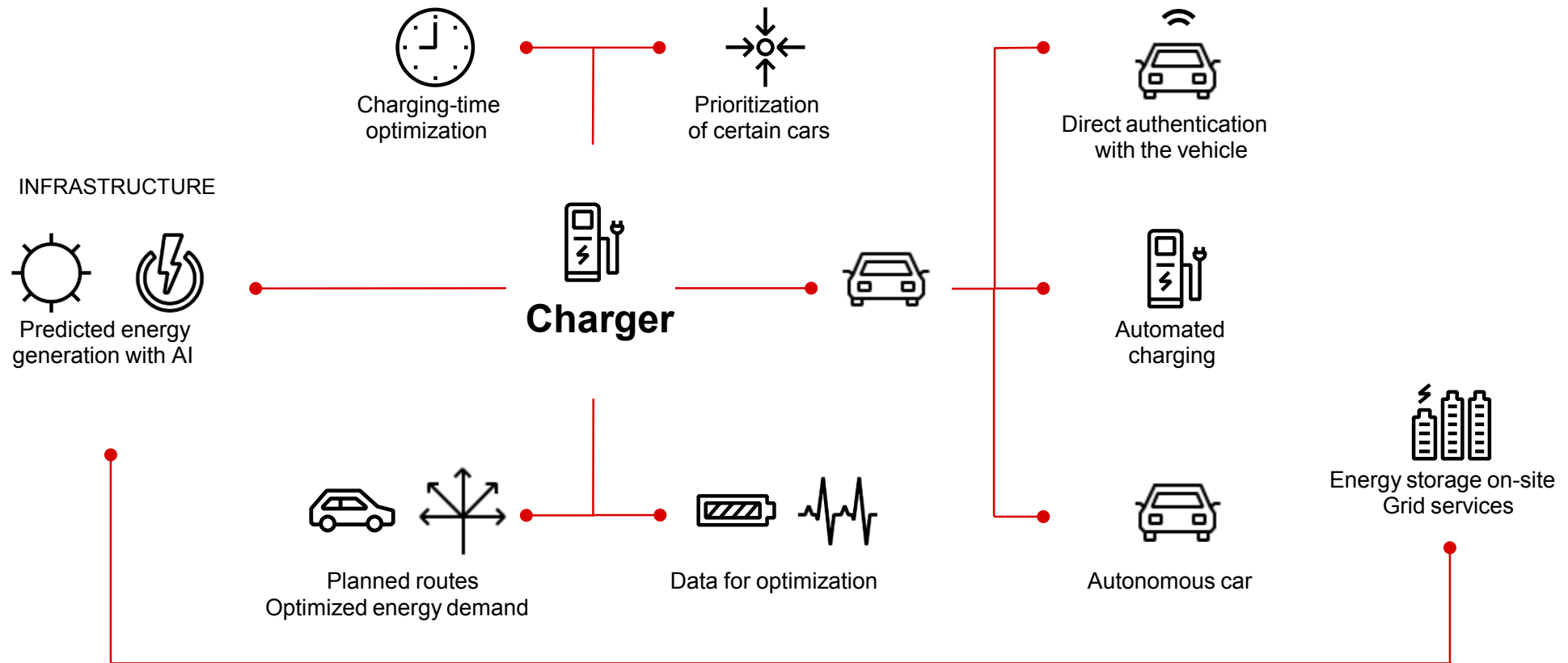




# Future use case “charging on highway”



# Future use case “charging of a fleet”









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**To conclude**

**We must accelerate the adoption of  
sustainable energy solutions in Romania**

**We must run the world without  
consuming the earth**

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**Let's write the future.  
Together.**



**ABB**