July, 2nd 2019,Timisoara

Future transportation and infrastructure electrification

Constantin Ichimoaei – Executive Manager

ABB a pioneering technology leader in digital industries

19th century

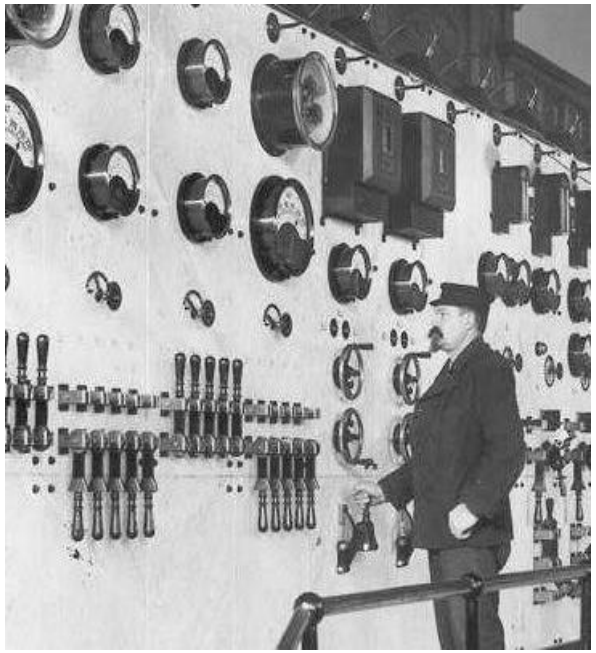
20th century

21st century

Towards autonomy: scaling the tele-operators

Complexity beyond human comprehension–scaling the people

~1910



~1990

~Today

Future

Decision making: human operator – Data based support: artificial intelligence

Innovation is key to ABB’s competitive advantage

Leadership built on consistent global R&D investment

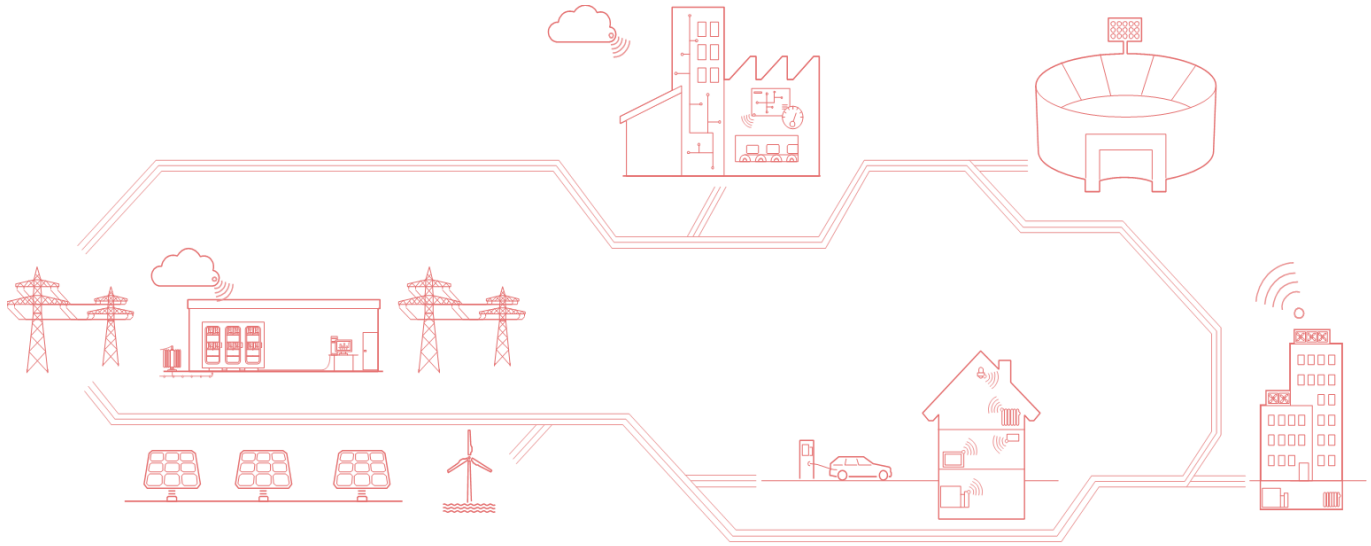
More than $1.5 billion invested annually in R&D

Collaboration with 70 universities

7,900 scientists and engineers

7 corporate research centers innovating globally

Electrification



Partner of choice for safe, smart and sustainable electrification

Megatrends shape the future

Urbanization

70% of the world's population will live in cities by 2050[1]

UN study

Digitalization

By 2020, 33bn+ internet-connected devices will be used worldwide[2]

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

Solar applications

The market segments we operate in

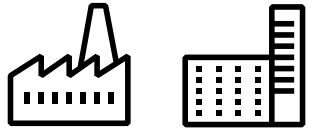
From a single kilowatt to multi-megawatts

Residential

Usually projects **below 10kW**

- All about rooftop, typically single phase, one or very few inverters
- High value to connectivity, user friendly

Commercial & Industrial



Between **10 to 5000kW**

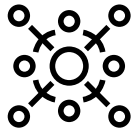
- C&I roofs, all three phases, some or many inverters
- Flexibility, compactness and performances the keys

Utility

Above **5000kW**

- Massively ground mounted
- From LV to MV, always big and many units
- $/W, performances and O&M on top

Microgrid



On/Off-grid projects

- From kw up to MW
- Rural installations primarily in Emerging countries

For on- and off-grid applications, across all power ranges and business models.

Residential

One-stop-shop for your residential installations

Fully coordinated system compliant with the local grid

Residential storage system stores surplus energy

Commercial and industrial

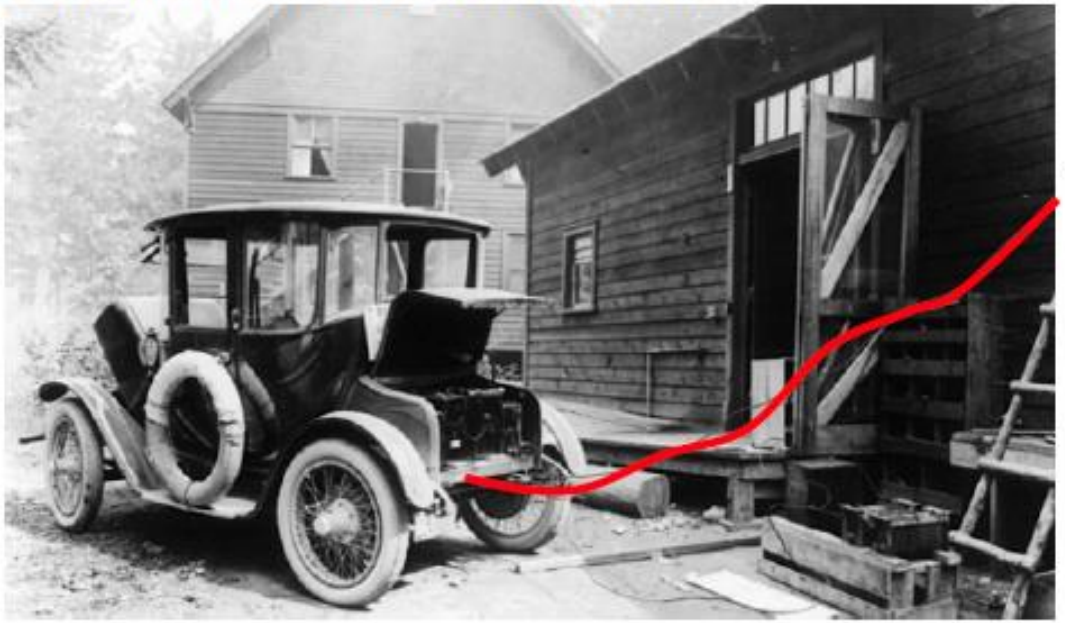
Configurable, modular product design for flexible and easy installation

Connectivity and smart inverter capabilities for integration in smart environments

Future transportation and infrastructure 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.“

Bundesarchiv, Bild 130-98242
Foto: Tellgmann, Oscar | 1913

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

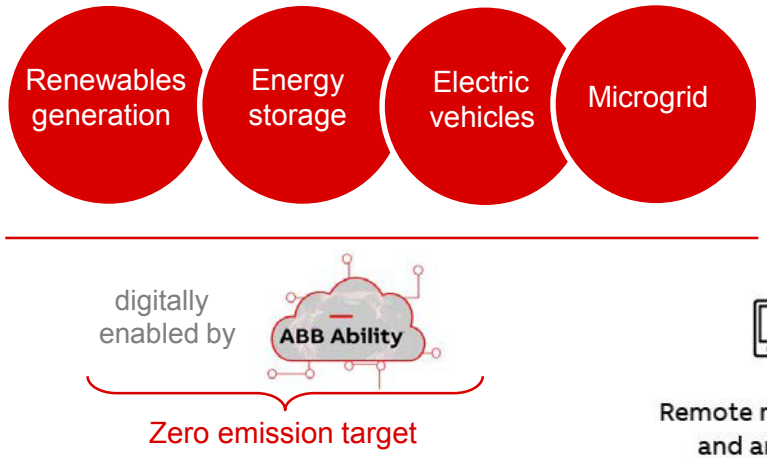
We need to reinforce the grid

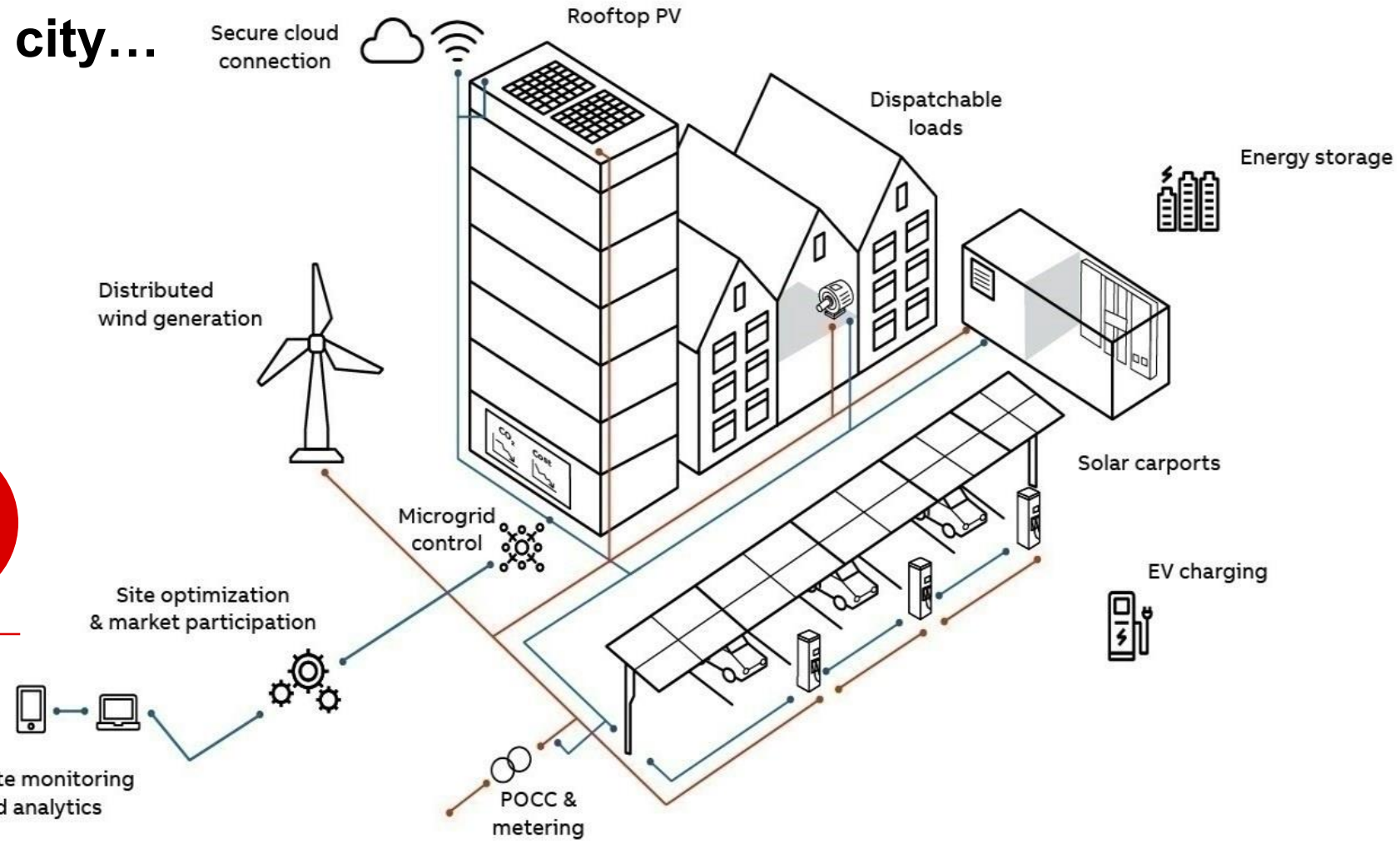
4

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

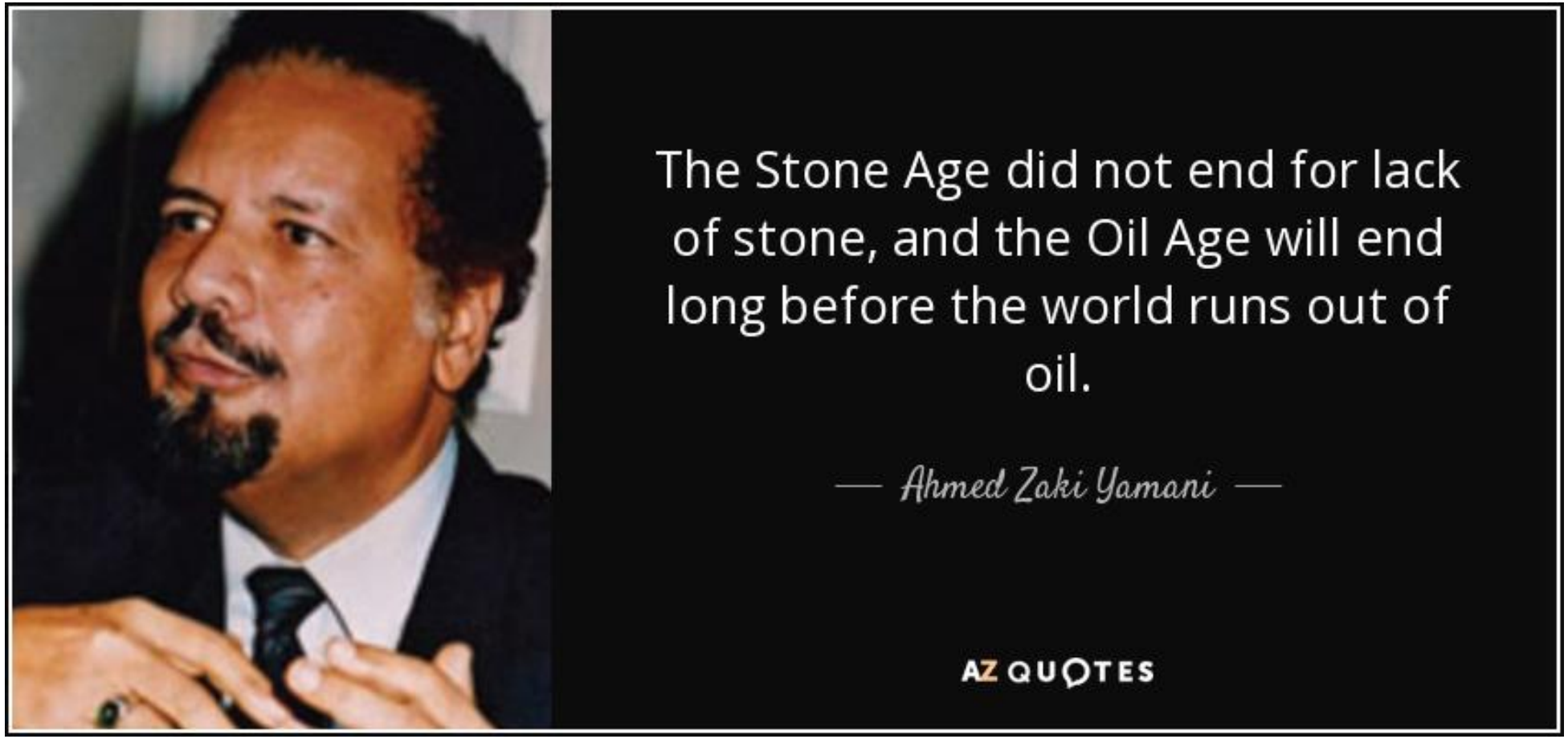




Consumers become prosumers: from homes, to commercial buildings to cities

The future is Electric

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



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

First in Europe and the Americas

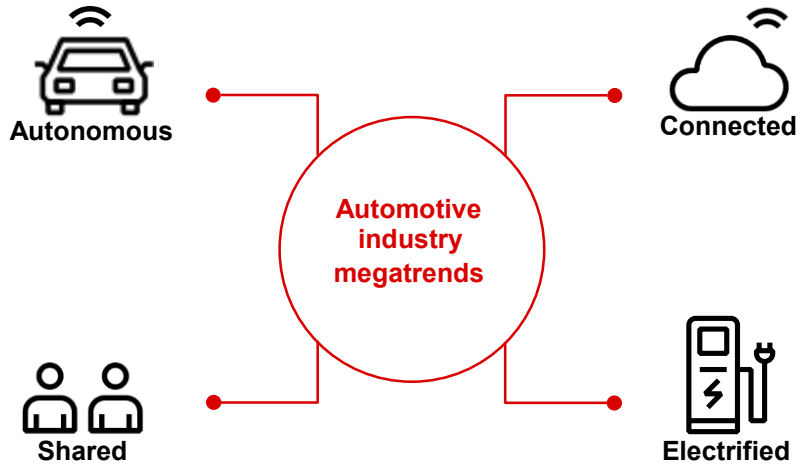
VW/Wolfsburg and BMW, June/July 2013

GM & BMW in San Diego, September 2013

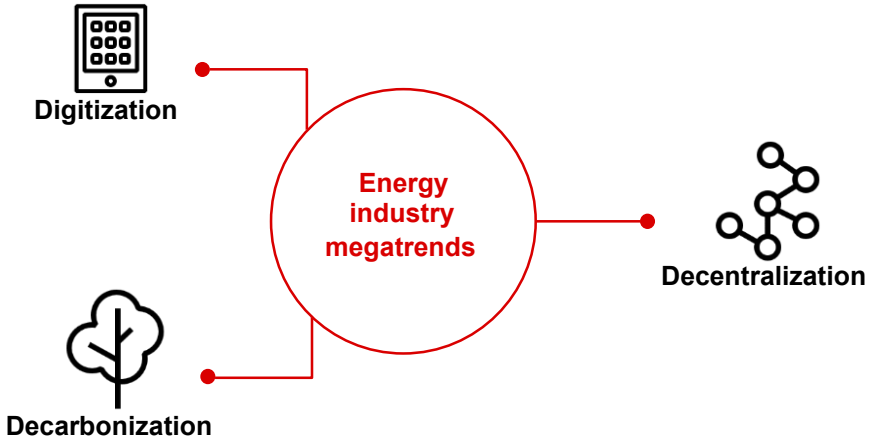
Disruptive trends are currently re-shaping the mobility and the energy sector

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

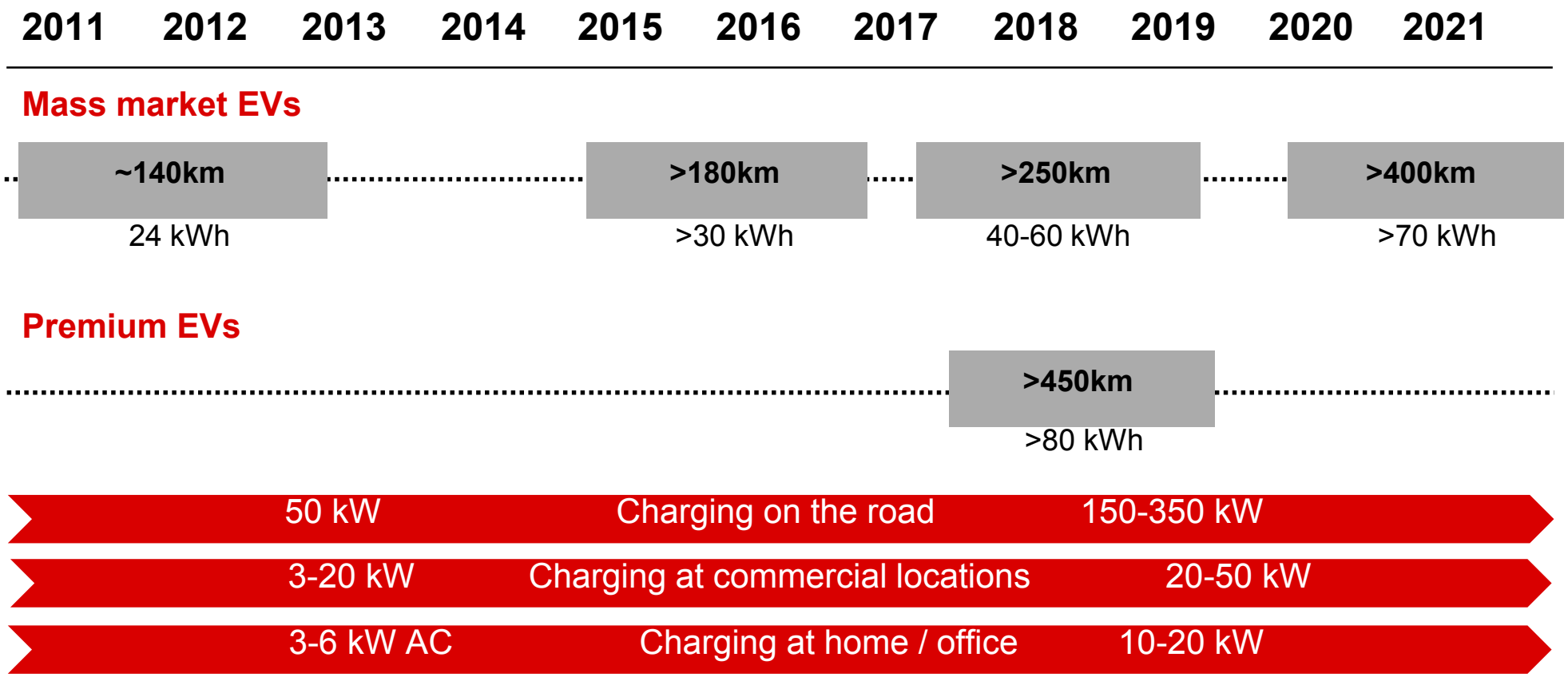
Field experience from installed base and thousand of service engineers; since 2015 only more than 100 GWh charged in ~ 15 Mio charge sessions

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

Driver: The EV range roadmap

Batteries get bigger, range gets longer



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)

≥ 50 kW

20 – 90 min

DC high power & bus charging

150 – 350kW+

10 – 20 min

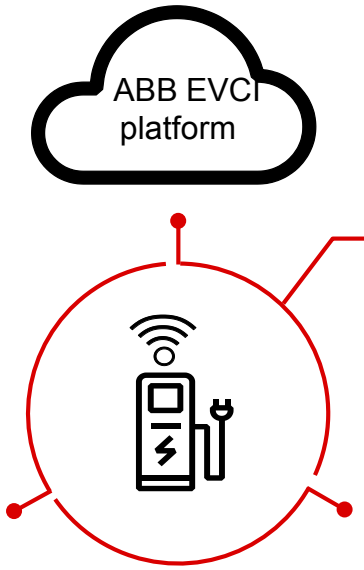
Public and commercial car charging – use cases

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



Integration with APIs & advanced web tools

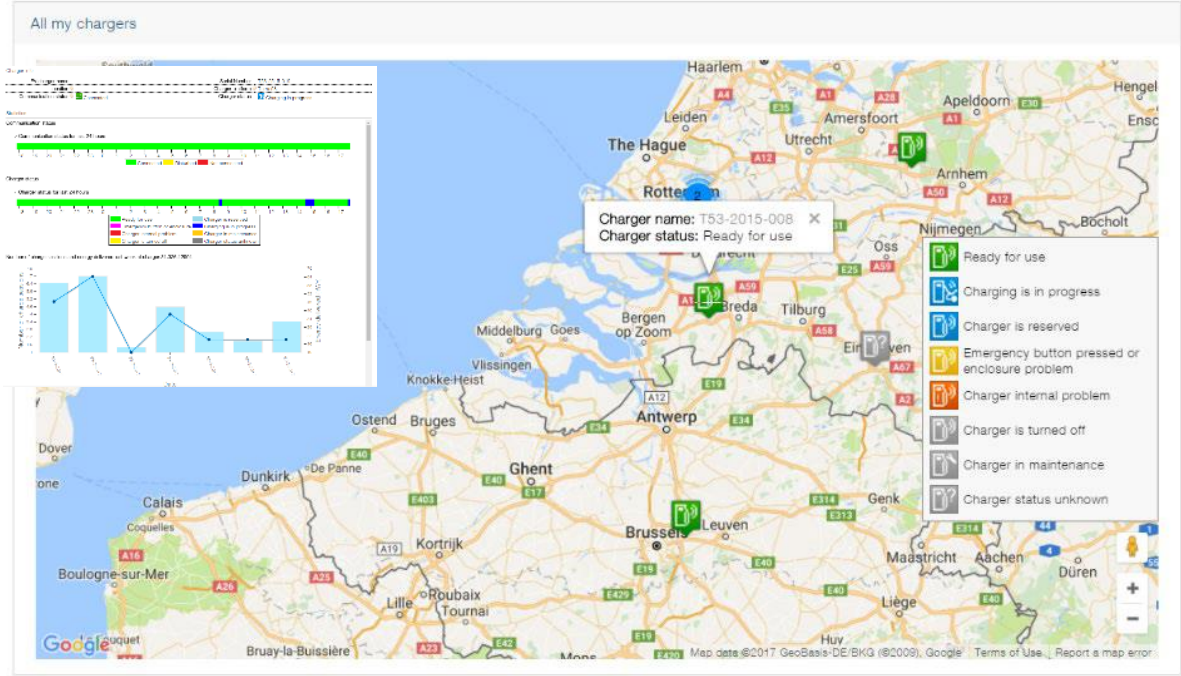
Charger Management

Proactive status monitoring
Remote software updates
Remote trouble shooting
Quick demand response

Consumer benefits

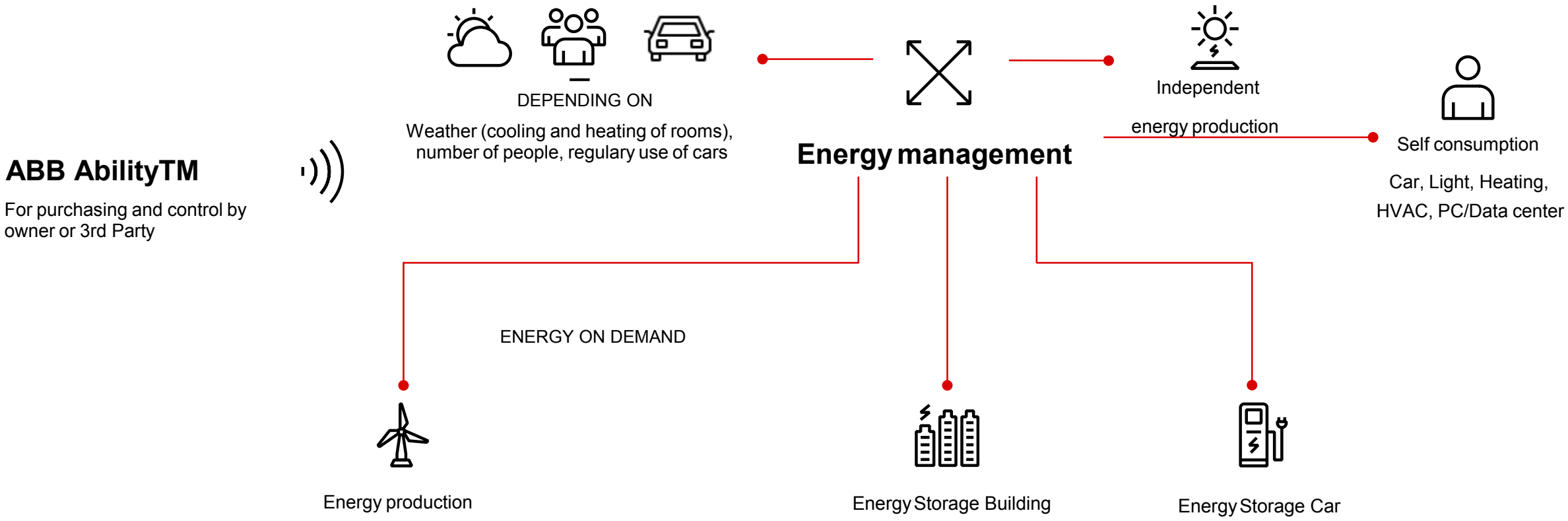
Authentication and billing
Subscriber management
Operational B2C services

Web tool - real time monitoring and configuration



Energy- and load management

Energy management and integration of renewables



To conclude

We must accelerate the adoption of sustainable energy solutions in Romania

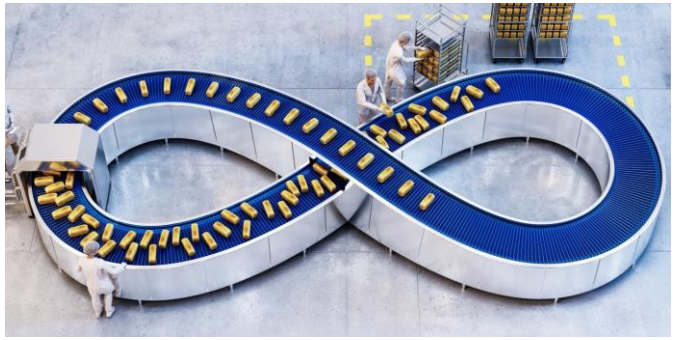
We must run the world without consuming the earth

Let’s write the future. Together.

We are the partner who can power, automate and digitalize your production

You need an experienced partner
who understands the big picture expectations

Efficiency



Digitalization

Sustainability

Safety

Reliability

Quality


ABB