life.augmented

Innovative Power Solutions driving towards Carbon Neutrality and Greener Future

Francesco Muggeri
VP of Marketing & Applications, Power Discrete & Analog, APeC/China, STMicroelectronics

Global Challenges and Opportunities

Looking ahead to a sustainable living environment

Increased of population and demand for better lifestyle expectation	Demand for more energy above 30% by 2030 versus 2020*
Global Regulations and Standards	Raising mandatory environmental sustainability standards and reusable/ recyclable materials (i.e. Singapore's RSA and Green Building MasterPlan**)
Innovation and Progress	Speed-up adoption of new technologies to improve efficiency. (i.e. 80% of buildings to be green by 2030**)

Source: IEA*,SGBC and RSA(Resource Sustainability Act)**

life.augmented

Trends in sustainability

Sustainability driven on all levels of society

Nations

China
2030: Peak Carbon Emissions
2060: Carbon Neutral

Europe & USA
2050: Carbon Neutral

Corporations

ST
2027 Carbon neutral
Commitment

- **83%** reduction in our PFCs emissions efficiency since 1994
- **51%** renewable electricity.
- Participating in Apple clean energy program
- **27%** direct & indirect emissions efficiency in 2021 vs 2020

CARBON NEUTRAL

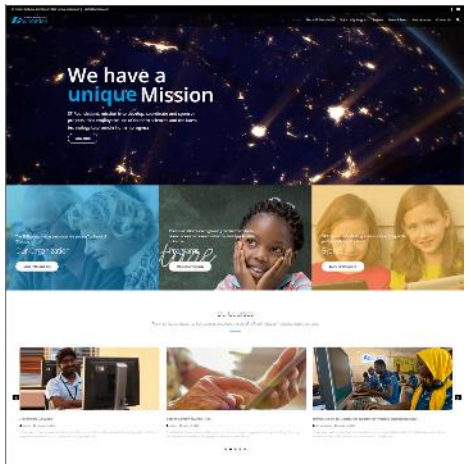
Individuals

Responsibility, awareness & actions

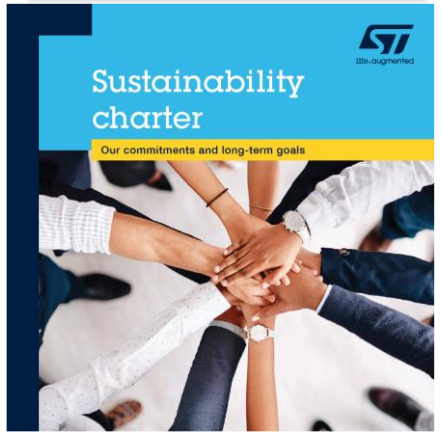
Awareness & Actions

life.augmented

Sustainability has been engraved in our business model and culture for 30 years



SUSTAINABLE TECHNOLOGY by ST



1987	**Creation of ST.** Business **conduct & ethics policy**
1993	First **environmental policy**
1995	First **environmental decalogue** (long-term goals)
1997	First **environmental report**, ISO 14001, EMAS
2000	Signatory of the **UNGC 10** principles
2001	Creation of **ST Foundation**
2002	Establishment of a **reforestation** program
2007	**Conflict Minerals** program
2011	**Sustainable Technology** program
2012	**ISO 50001** energy management
2014	5th **Environment, Health & Safety Decalogue**
2016	ISO 22301 **Business Continuity** 1st certification
2019	**2025 CO_2 goal achieved**
2020	Commitment to be **Carbon Neutral by 2027***
2021	New **Sustainability Charter** published
2023	**26th annual Sustainability report**

CARBON NEUTRAL

*on scope 1 & 2 and partially scope 3

life.augmented

ST will be carbon neutral by our 40th anniversary

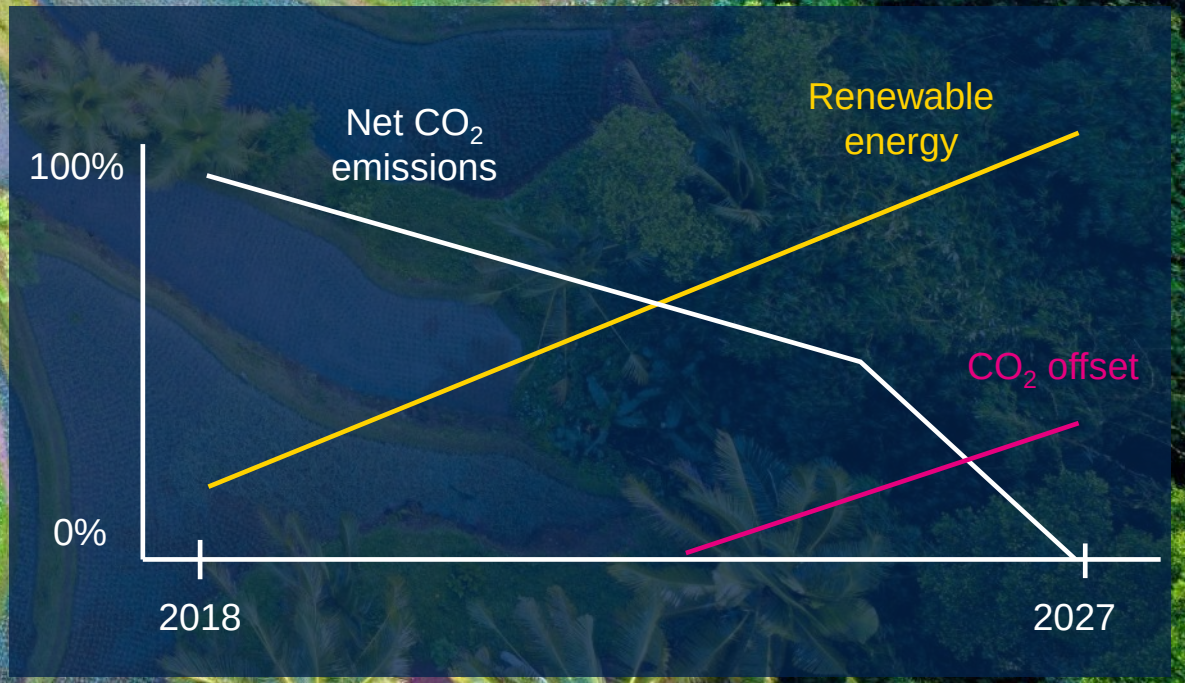
Milestones

- Compliance with the 1.5°C scenario by 2025 – recognized by SBTi
- Carbon neutral by 2027
- Sourcing 100% renewable energy by 2027

- Collaborative programs and partnerships for carbon neutrality throughout our ecosystems

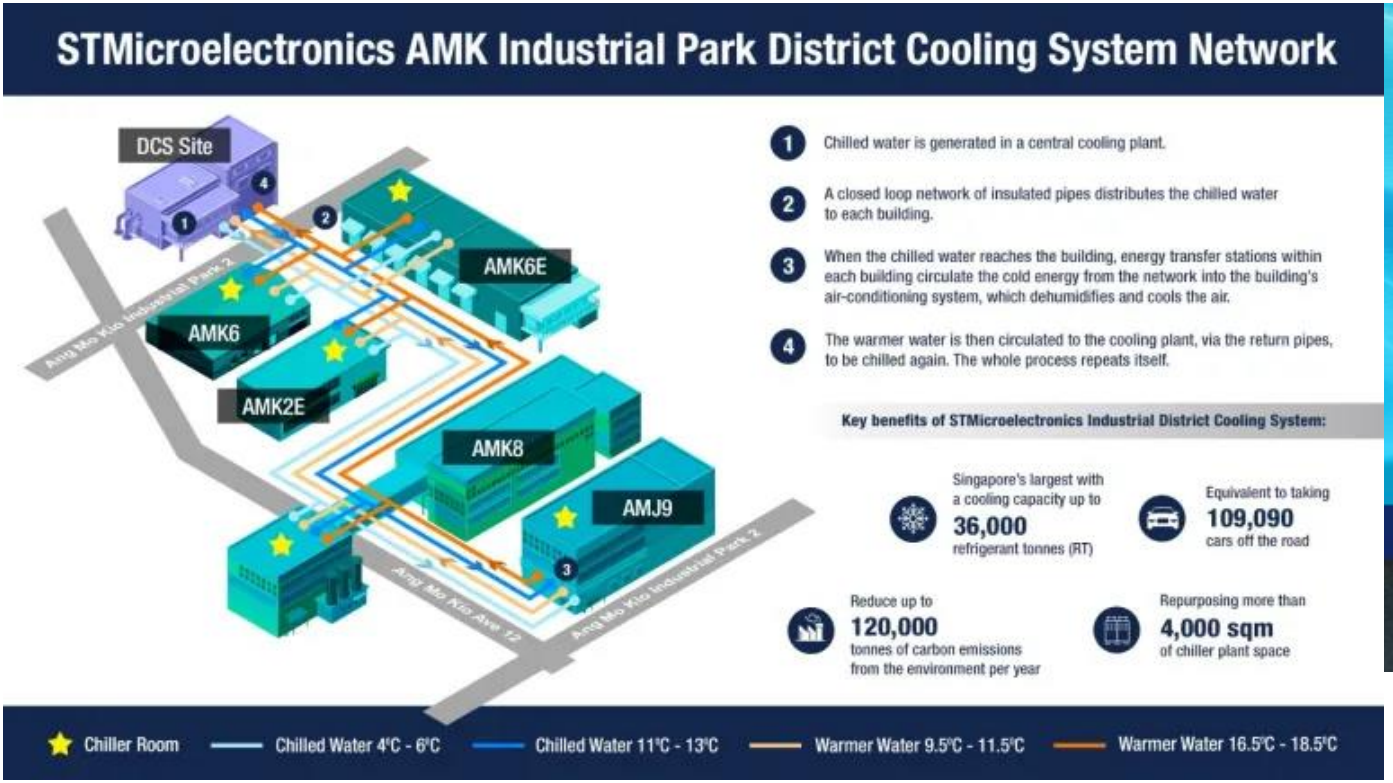
SCIENCE BASED TARGETS
DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

CARBON NEUTRAL



life.augmented

Smart City: District Cooling system



Smarter City

- STMicroelectronics supports Singapore Green Plan Initiative with the district cooling system
- 20% savings in cooling-related electricity
- Reduce Carbon Emissions up to 120KTons/yr

We act as role model in creating value for all stakeholders

2.2 Million tons of CO_2 avoided

16 Billions liters of water saved

53 Kilo tons of waste recycled

Yearly impact of our respective programs. 2022 data

life.augmented

We are recognized as leader by all rating agencies

FTSE4Good

Member of
Dow Jones
Sustainability Indices
Powered by the S&P Global CSA

EURONEXT
vigeo eiris
INDICES

MSCI
ESG RATINGS
AAA
CCC | B | BB | BBB | A | AA | AAA

Corporate ESG Performance
Prime
RATED BY ISS ESG

ISS QualityScore
SOCIAL
Highest Rating By
INSTITUTIONAL SHAREHOLDER SERVICES

ISS QualityScore
ENVIRONMENTAL
Highest Rating By
INSTITUTIONAL SHAREHOLDER SERVICES

A
SCORE CARBONE®
AXYLIA

axylia

Bloomberg
Gender-Equality Index
2023

CDP
DISCLOSURE INSIGHT ACTION
A LIST
2022
WATER

EURONEXT

CAC 40 ESG Index
MIB ESG Index

life.augmented

We are leading the industry in terms of sustainability performance

20%
energy efficiency gain vs 2016 (2025 commitment)

35%
women in our workforce

-40%
GHG emissions scope 1 & 2 since 2018

CARBON NEUTRAL

86%
employee engagement rate

30%
of women hired in management and engineering positions

DJSI
included in World and Europe indices

CDP
DISCLOSURE INSIGHT ACTION
A LIST 2022
WATER

100%
of our products are conflict-mineral free

23%
of our revenues from responsible products

by ST
SUSTAINABLE TECHNOLOGY

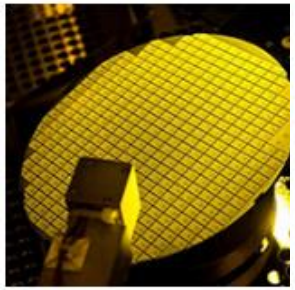
660+
community initiatives worldwide

95%
of waste reused, recovered or recycled

100,000+
beneficiaries of our STEM your way program

186
R&D partnerships

0.10
Recordable case rate for employees – among the best-in-class



62%
of renewable electricity (100% by 2027)

13,700+
people trained in diversity and inclusion

life.augmented

Solar power generation a key contributor to sustainable energy

Generate, Store, & Share electricity thanks to semiconductors

3.6% solar PV power In 2021 — **Of global electricity generation**

22% growth vs 2021 — **In global solar PV power generation**

38% from China — **PV power generation growth**

7x PV production — **Increase required by 2030 vs 2021 for Net Zero Scenario**

*WBG = Wide Bandgap Semiconductors such as Silicon Carbide and Gallium Nitride

Key ST Devices

Inverter
WBG* & Silicon Power MOSFETs, IGBT
Power Modules
Rectifiers, fast diodes
Galvanic isolated drivers

Power management
WBG & Silicon Power MOSFETs
Power Modules
Rectifiers
PWM controllers
Galvanic isolated drivers

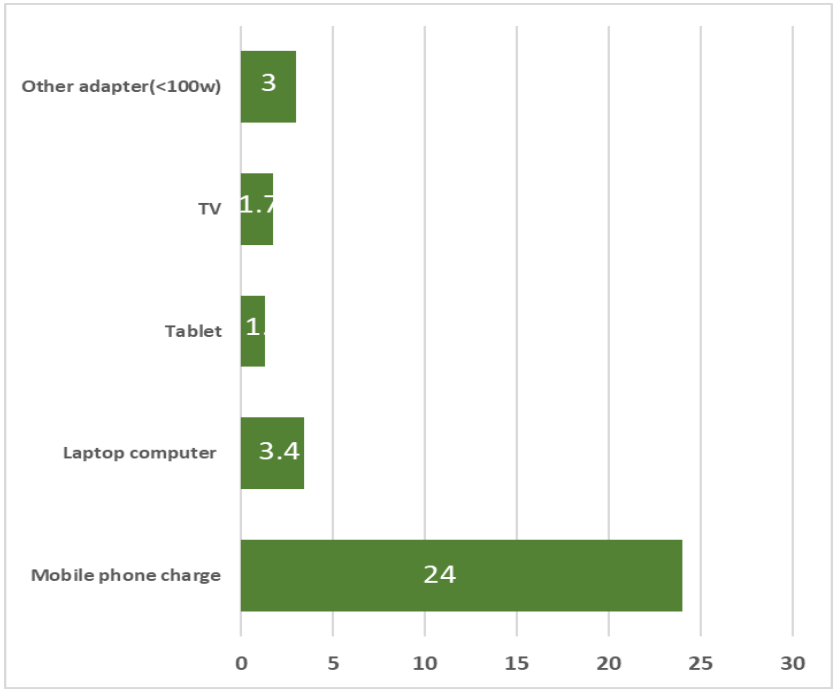
Battery management
Battery management ICs
Microcontrollers
Regulators

Source: IEA

life.augmented

Global Energy: Impacts from Standby Power

Total Number of Equipment in Use Yr22 (Bn)



23,015 TWh:
total worldwide electricity consumption (2020)

65mW current AVG standby power to **5mW** (Zero Standby Power)

we will get a total energy saving of **17.56 TWh**

By reducing our energy consumption, we can reduce our carbon footprint

60mW/unit energy saving equals ~ 3 standard nuclear plants

11.01 MMBOe

2.31 M tce

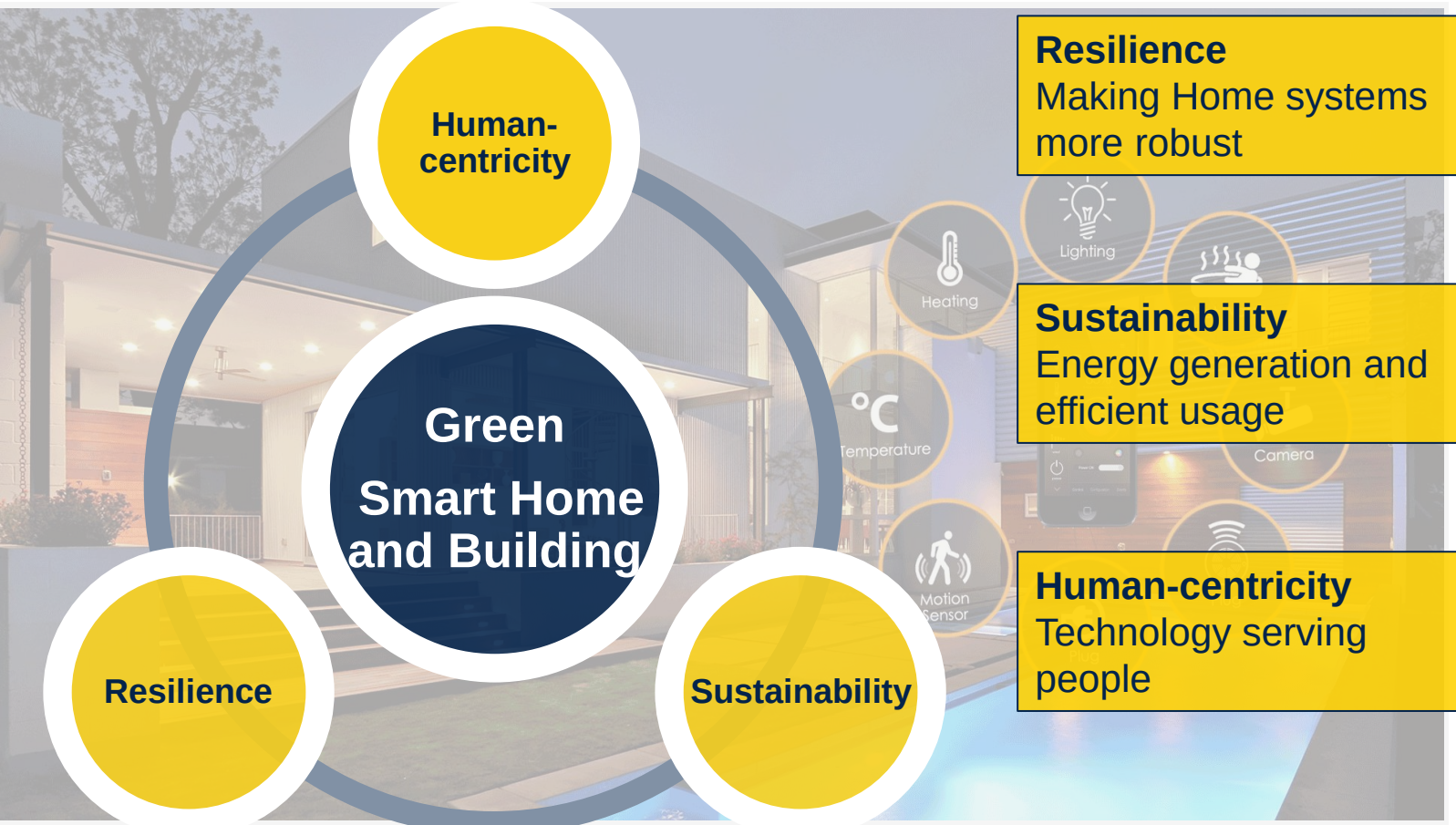
4.38 Tg CO_2

tce: tonnes of coal equivalent, **toe**: tonnes of oil equivalent
MMBOe: Million Barrels of Oil Equivalent
Sources: Statista, EarthWeb, STMicroelectronics

life.augmented

Standby power is one of the most significant contributors to global energy consumption. It makes **up 10% of all electricity use worldwide**. In order to combat this, electronics companies have been making changes to their products that help reduce the amount of standby power they use.

Innovation trends



Resilience
Making Home systems more robust

Sustainability
Energy generation and efficient usage

Human-centricity
Technology serving people

Digitalization
Advanced Smart Home (AI-driven systems) and scalable/adaptable systems

Efficiency and Insulation
Efficient energy management systems and Reduction of energy consumption

Simple, Safe and Secure
User-friendly systems that provides safe environment and home security

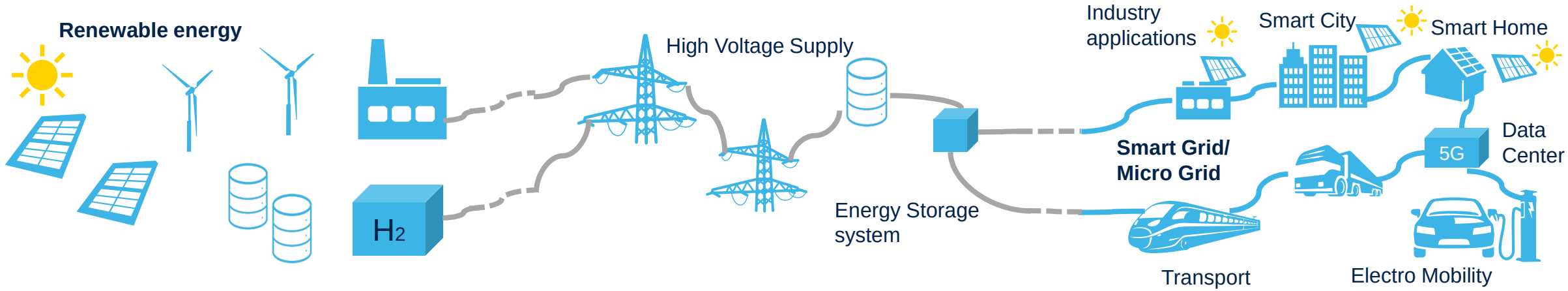
life.augmented

Power & Energy: conversion chain

Energy Generation

Transmission/ Storage

Consumption



Centralized Energy Generation

- Solar: 19% CAGR (2022-27) [1]
- Wind : 13% CAGR (2022-27) [1]
- Energy Storage: ~30% CAGR (2022-30)[2]
- Energy Distribution

Energy Distribution/Management

- Smart Grid: 19.1% CAGR (2021-26) [3]
- Energy storage
- Automated Energy Management: 12.67% CAGR (2022-27) [4]

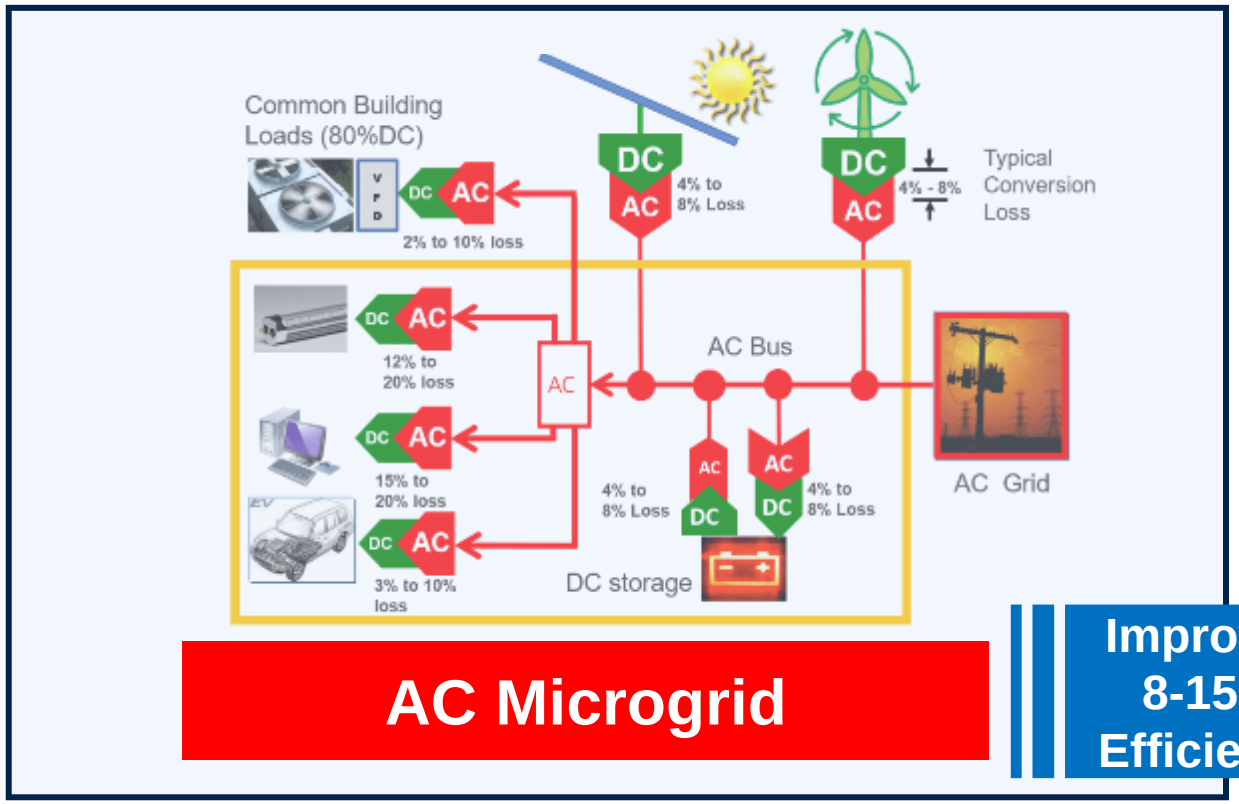
Distributed Energy Generation

- Smart Agriculture (Global CAGR 9.4%, 2023-28)[5]
- Manufacturing & Process Automation (CAGR 8% 2022-25)[6]
- NEV (China): 38.24% CAGR (2021-26) [7]
- Charging Pile: 44% CAGR (2022-25) [8]

life.augmented

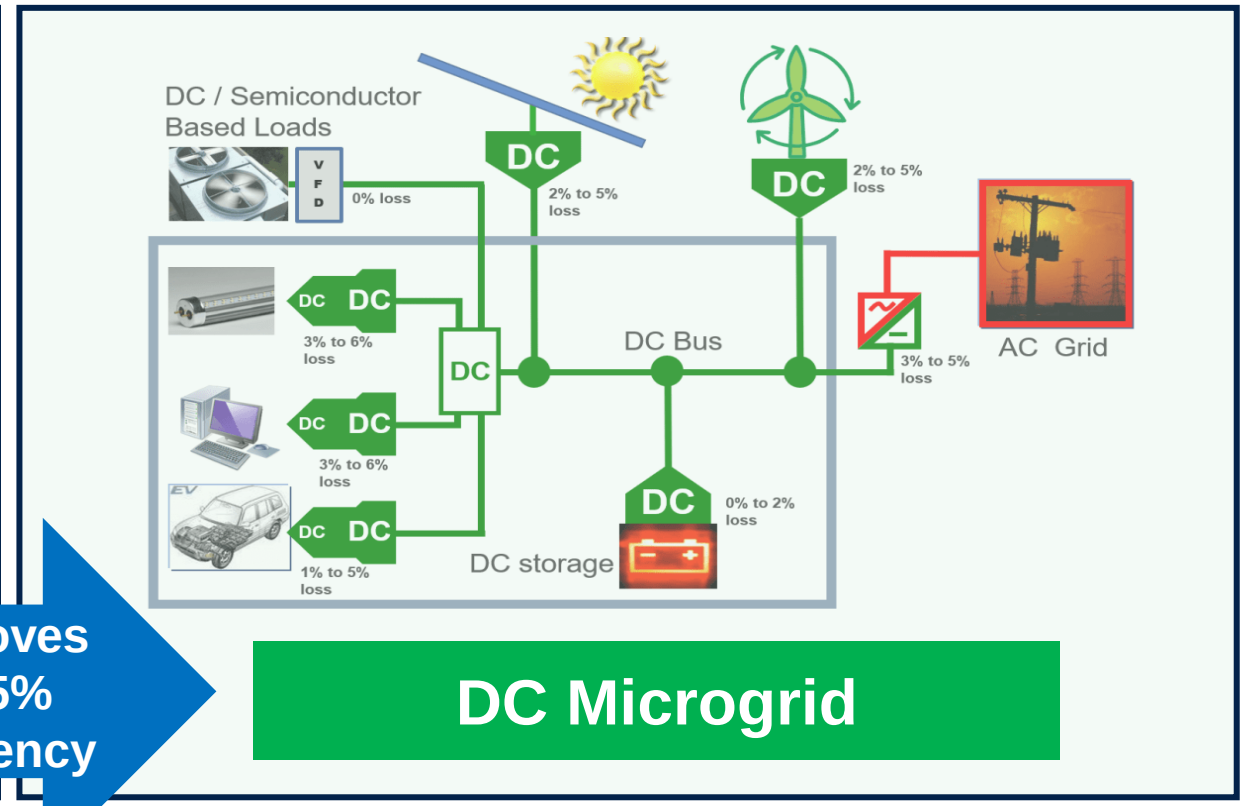
Sources: IEA report[1],BNEF[2]; ; GlobeNewswire and Report Linker [4, 7] ; marketandmarket.com[3,5,8] ; Industrial Semiconductor Market Tracker-OMDIA 2Q2022[6]

New Microgrid Architectures beyond 2025



AC Microgrid

Improves 8-15% Efficiency



DC Microgrid

CurrentCDS

Set as non-profit, open, independent foundation for promotion and adoption of DC microgrid.

Objective is to provide free access to IP, for safe and stable.

DC-INDUSTRIE
ENERGIEWENDE TRIFFT INDUSTRIE 4.0

Funded by Germany Federal Government.

For safe and robust energy, supporting connection to the supply grid and maximum use of decentralized, regenerative energy.

life.augmented

Leader in SiC MOSFET

Focus applications

Power supply

UPS

Solar Inverter

Industrial Motors

EV Charger

Traction

OBC, DC-DC

ST business perspective

>40%

Today market share automotive & industrial

>$1B

SiC revenues in 2023

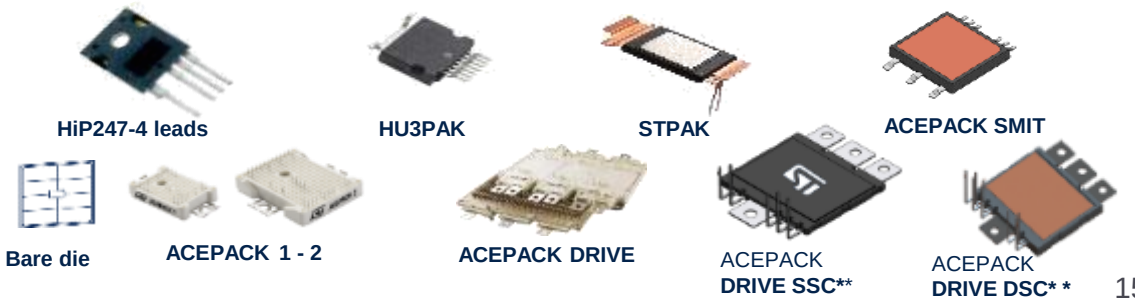
>115

projects in development

Current offer and roadmap: from 650 to 2200 V

Gen1	Optimized **Ron** and **Tj** for **motor drive** applications
Gen2	Balanced **Ron** and **Qg** for industrial and automotive
Gen3	**Lower Ron** vs. Gen2 maximizing the driving range of EVs
SiC VHV*	**Very High Voltage SiC** 2200V Available in bare die option
Gen4*	**Lower Ron** vs. Gen3 tailored for traction inverter
Gen5**	Innovative **high power density technology** structure
MDSiC**	Radical innovation, outstanding Ron value at hot temperature and further Ron reduction vs. Gen5

Advanced packaging



Source: Power Discrete and Module Market Tracker Preliminary 2021

*Under development

** R&D stage

life.augmented

Benefits of GaN Technology

Adapter for tablet and notebook: fast charger

4x smaller

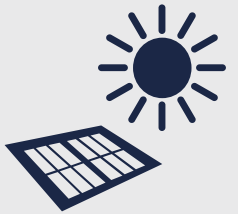
3x lighter

Server power supply and Telecom Base station

50% higher power density

20% lower P_{LOSS}

Solar ESS (Energy Storage System)



2x smaller

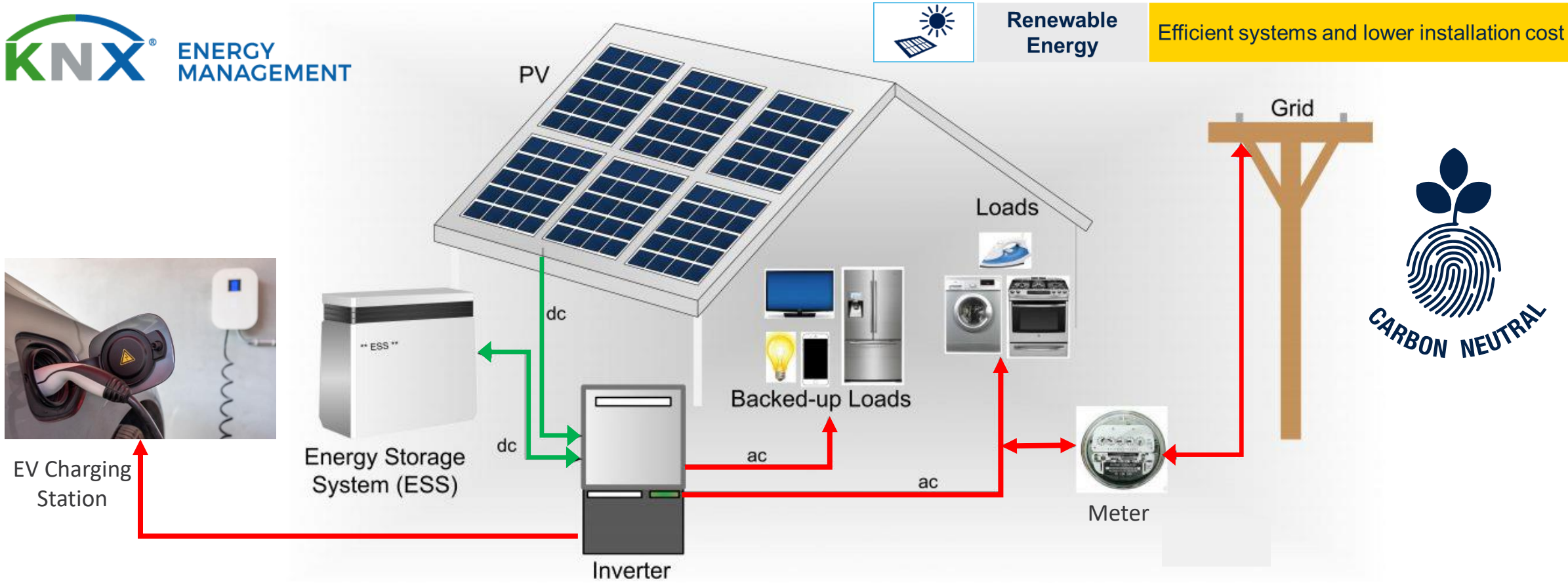
3x lighter

Renewable Energy and Energy Storage Systems

Addressing energy efficiency in Home, Building and City

KNX ENERGY MANAGEMENT

Renewable Energy	Efficient systems and lower installation cost



Smart Home	Intelligent Usage of Energy at home
Charging Station	Efficient usage of EV charging stations
Energy Storage	Higher efficiency, Better Management and increased lifetime
Home Appliances	High Efficiency and smart utilization

life.augmented

Home & building energy savings

Residential & commercial lighting, HVAC and appliances use >50% of total electricity consumption

>40% Energy Saving	**Washing machine** From Class D to Class A++
>30% Energy Saving	**Air conditioning** From analog to digital From AC to BLDC control
>70% Energy Saving	**Digital consumer power supply** Efficiency > 98% in run mode Stand-by power < 1mW
>80% Energy Saving	**Electronic lighting** From incandescent bulbs to LED lighting

Smart Home and Building
Lighting Management
Heating-Ventilation-Aircon Management
Energy Storage Systems
Intelligent usage of EV charging Stations

Adding **more intelligence** to bring the next step in saving

Source: IEA,EPA

life.augmented

Key takeaways

ST strong Commitment to Sustainability

ST is committed in Carbon Neutrality and Sustainability

We offer **very wide product portfolio** to facilitate our product adoption in customer designs and projects

ST provides you with **better power efficiency, smarter communication a**nd more **intelligent energy usage solutions** to address rising demand for renewable energies globally and for Smart Home and Building Automation

life.augmented

ACCELERATING SUSTAINABILITY

TOGETHER

life.augmented

Thank you

life.augmented