

How technology boosts bioeconomy

Prospecting Mission Hannover 2023
Showcases – The role bioeconomy for the decarbonization
Hannover Fair – April 18th, 2023



Our sustainability value propositions



Decarbonization & energy efficiency

Managed product
CO₂ footprints

Renewables integration
and electrification



Resource efficiency & circularity

Circular products and
efficient productions

Efficient building
and electrification assets



People centricity & societal impact

Operator safety and
ergonomics

Occupant well-being,
safety and security

Siemens sustainability track record
More than 15 years of leadership ...

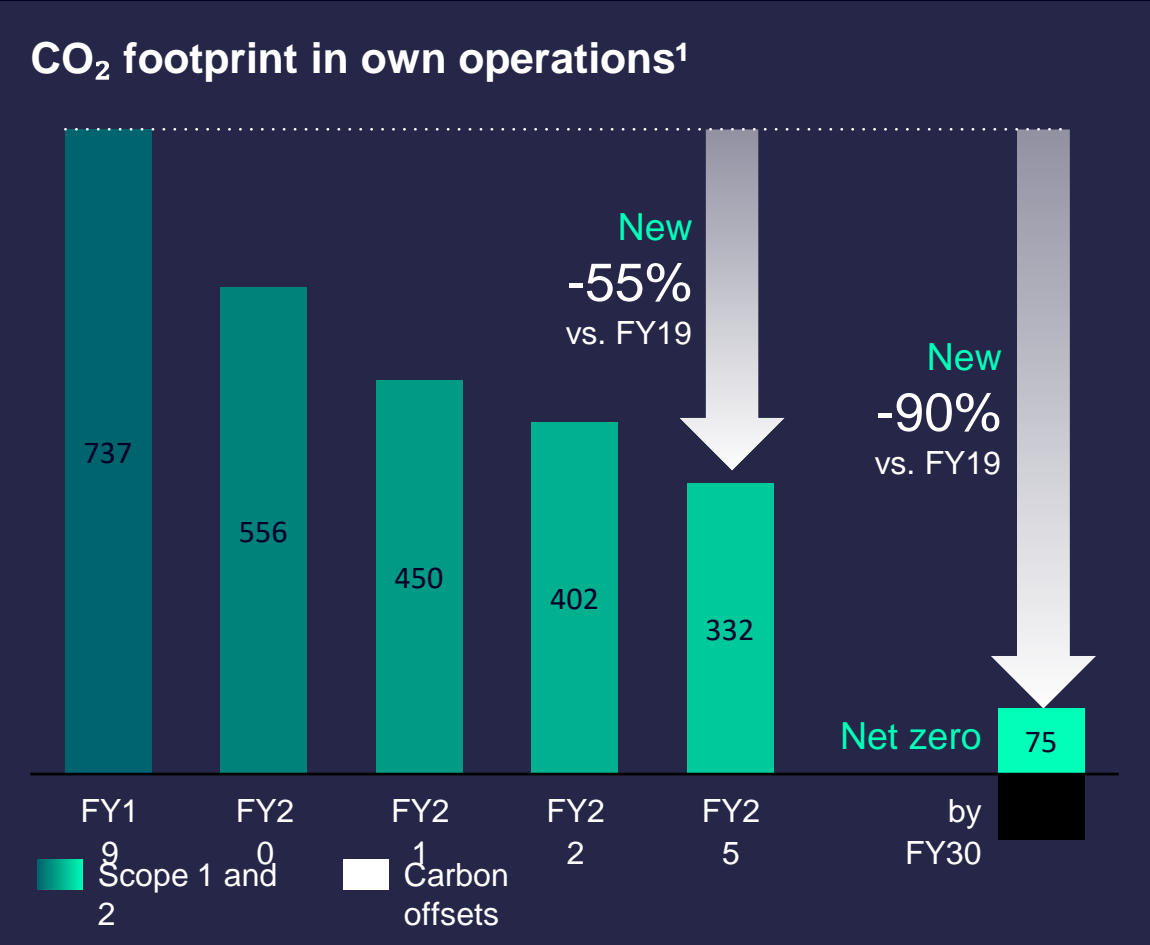
**Sustainability
in own
operations**



**Sustainability
business**

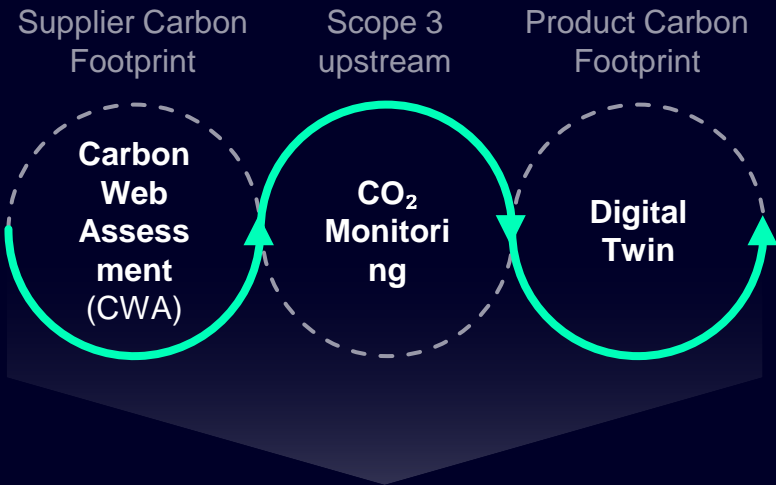
Net Zero Operations (Decarbonization)

We are accelerating CO₂ emission reductions in own operations



Consistent steps toward a net zero supply chain (scope 3 upstream)
Net Zero supply chain by 2050 and 20% emissions reduction by 2030

Collaboration and technology as enabler to reach targets



~1,200
suppliers reported their efforts via CWA in FY22 leading to

~9%
average reduction of CO₂ footprint

Resource efficiency

We support restoring and preserving biodiversity

Energy



We **increase energy efficiency** and reduce **consumption**

Waste



We optimize our **waste management** by **increasing re-use** and **recycling more** waste

Eco-Design



We design our entire offering in an **environmentally conscious** and **circular** way

Water



We conserve water by analyzing our **water stress** and **reducing negative impacts** of water usage



Biodiversity

We calculated our own and suppliers' biodiversity footprint according to SBTn* in FY22 and derived the necessary improvement measures

Siemens Biodiversity initiative

96

locations with active **biodiversity** measures

**Sustainability
in own
operations**



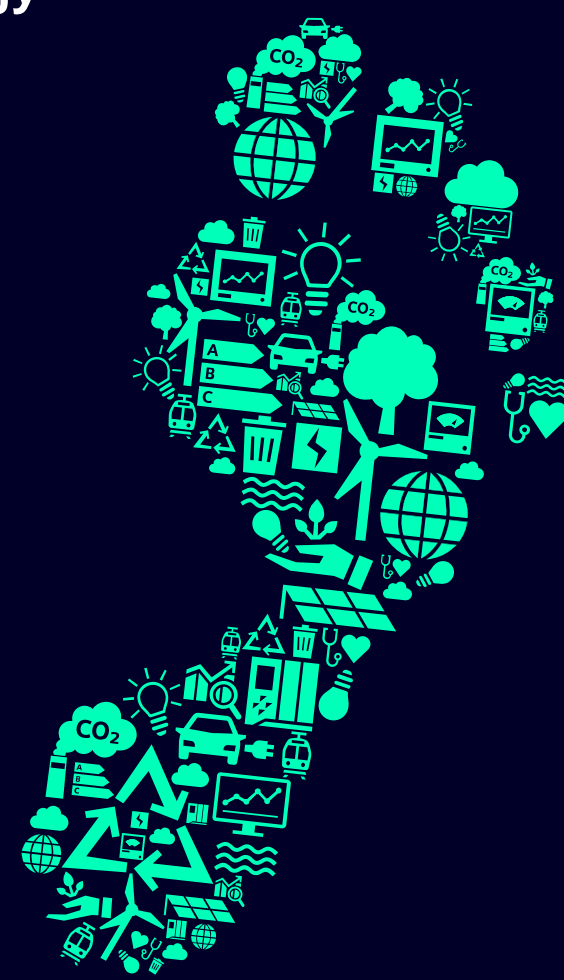
**Sustainability
business**

Companies Avoided Emissions through technology

~150

million tons of Customer
Avoided Emissions
through
the Siemens offerings
in FY22

“positive” CO₂ impact (saved or
avoided emissions) at customers
compared to reference solution.



Calculation methodology
for Customer Avoided Emissions

Siemens' proprietary methodology aligned with GHG Protocol scope 3 downstream reporting applied from FY22

Technology drives Sustainability

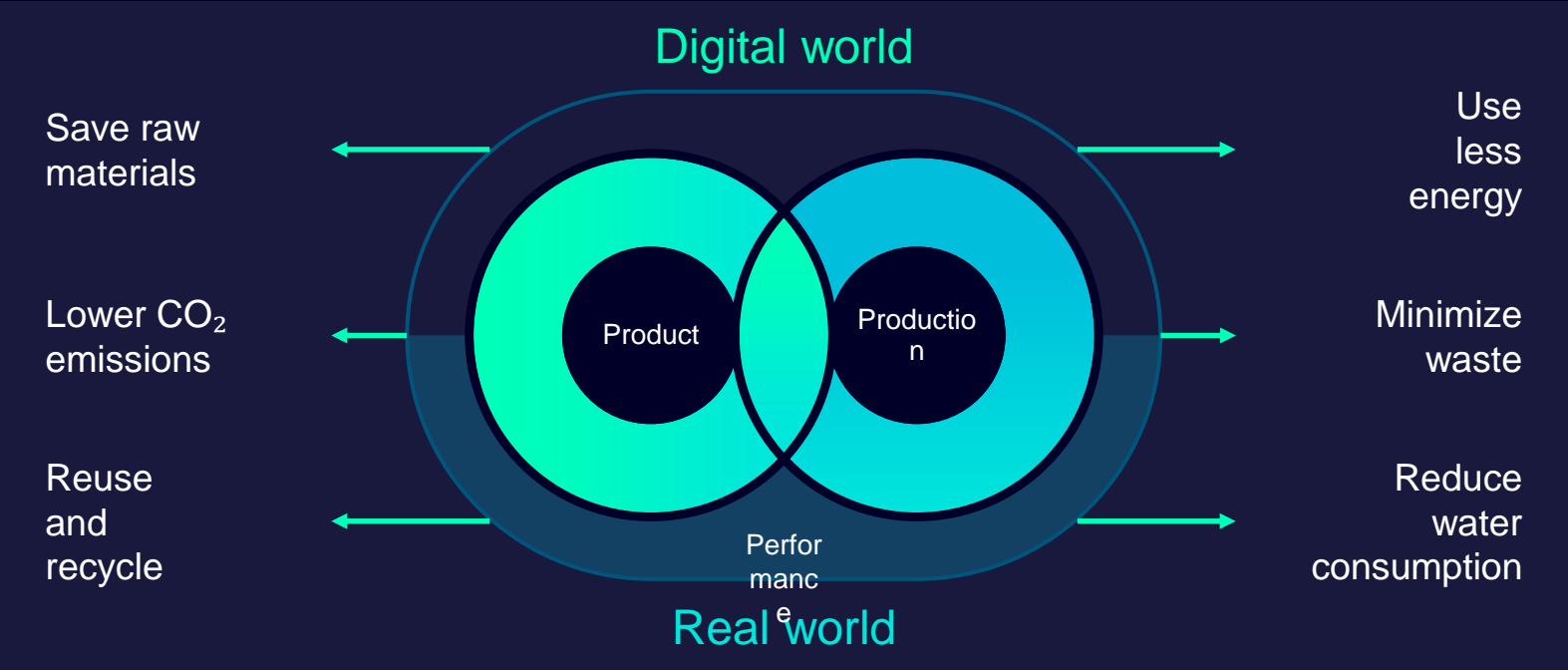
Technology enables companies to do more with less by combining the real and the digital worlds.

More productive, more efficient,
more innovative,
and faster.



Digital Twin for sustainability

General benefits



Comprehensive digital twin approach:

- Seamless flow of information from the real and digital world
- Holistic view of sustainability impacts along the value chain
- Continuous optimization loop to achieve greater sustainability



Product Carbon Footprint management Sigreen

Driving decarbonization
by making Product Carbon
Footprints actionable



SaaS application to exchange dynamic Product Carbon Footprint (PCF) along the entire supply chain

Efficient acquisition and secure exchange of real-time emission data enabling transparency and optimization

Confidential and decentralized data due to blockchain technology

Verifiable credentials for data trustworthiness

Open APIs to connect IT/OT for automatic data collection

Vertical farming



Decarbonization &
energy efficiency

Resource efficiency
& circularity

80 ACRES FARMS

Creating a more sustainable approach to farming through digitalization and automation

The challenge

- Expanding proven vertical farm technology and infrastructure globally is resource and capital intensive
- Enable continuous improvement to drive down unit economics to open new markets and position the business to operate globally

Solution

- Development of sustainable large-scale indoor farms
- Complete end-to-end digitalization and automation technology of the farms
- Implementation of an intelligent energy system, including power distribution, environmental control, fire safety and security, and asset management

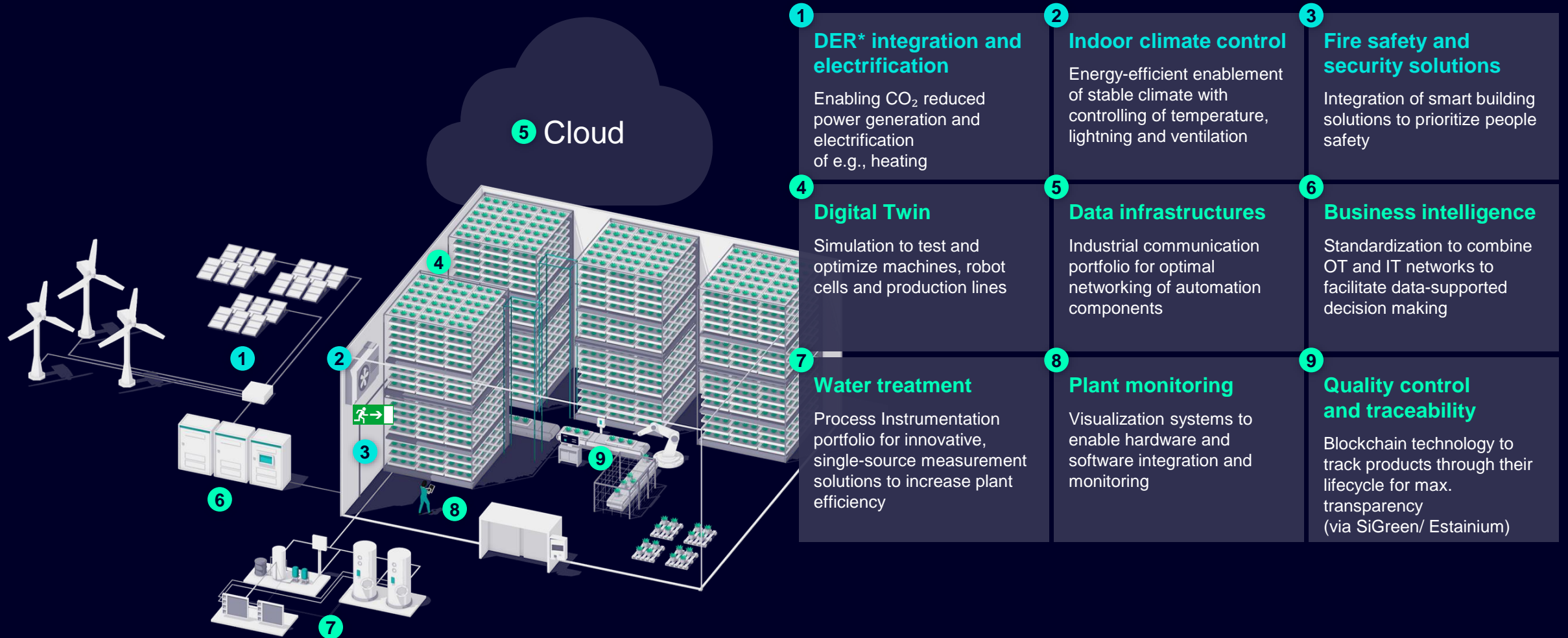
Customer benefit

- 95% less water used compared to traditional farming
- Powered by 100% renewable energy and eliminating pesticides
- Growing up to 300x as much food per square foot
- Lowering farm-to-table footprint and reducing overall waste

SIEMENS

Vertical farming

Creating sustainable farming through digitalization and automation



**Thanks
Danke
Merci
Gracias
Obrigado !**

Visit Siemens at Hannover Fair at booth D53, Hall 9
(> 2.800 m²)

José Borges Frias Jr.
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Siemens in Brazil



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