



# ENVIRONMENTAL SUSTAINABILITY THROUGH COLLABORATION

SEMICON EUROPA 2021 KEYNOTE ADDRESS

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# Market drivers



## 5G Network

Infrastructure, 5G phones  
6G coming (2030)  
*5G phones will increase by 1.9B in the next 5 years and overtake 4G shipments in 2023*



## AI

High spec CPUs  
Power management(heat)  
Autonomous vehicles  
Gaming



## Cloud Computing

Edge computing, server farms,  
increased memory, power  
management (heat),  
security (encryption)



## Gaming

Consoles, computers,  
screens,  
VR headsets



## Medical

Implants, remote diagnosis/  
monitoring



## Super Computing

Finance, defence, data mining,  
Bitcoin, medical, climate  
change modelling, IoT,  
Security (encryption)



## Automotive

EV charging, EV power  
management, autonomous  
vehicles, in-car  
infotainment, sensors



## Industrial

Industry 4.0, virtual reality  
*Smart factories,  
connected machines,  
machine data*



## Work from home

Servers, laptops, tablets,  
screens



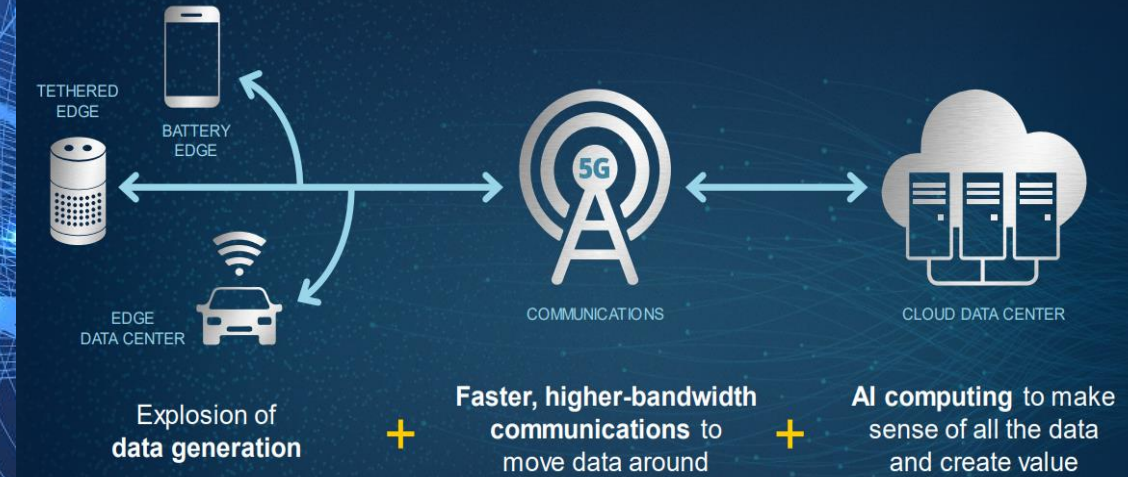
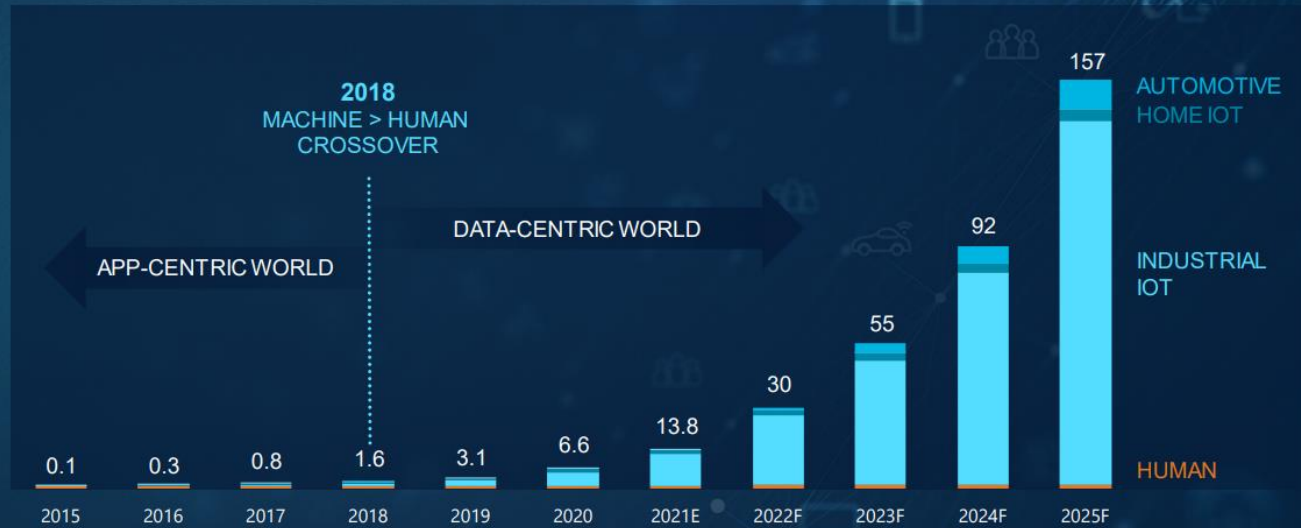
## IoT

Server farms, consumer  
electronics, signal  
processing



# The data revolution

Data Generation By Category (ZB)



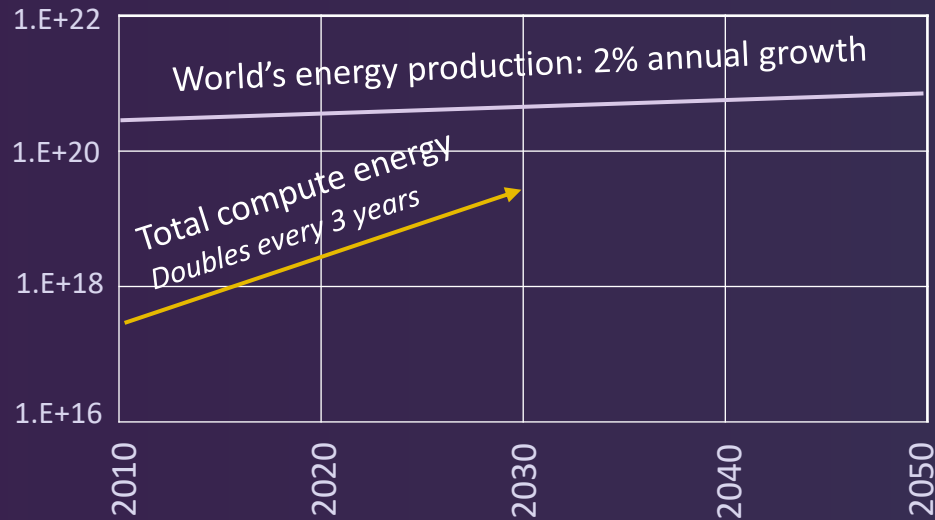
- Semi market growth is no longer limited by human consumption
- Multiple parts of the market are reliant on one another (connected)
- Silicon content is growing as everything gets 'smarter'

Semi content per unit	2015	2020	2025F
HIGH END SMARTPHONE	\$100	\$170	\$275
AUTO (GLOBAL AVERAGE)	\$310	\$460	\$690
DATACENTER SERVER (CPU + ACCELERATOR)	\$1,620	\$2,810	\$5,600
SMARTHOME (GLOBAL AVERAGE)	\$2	\$4	\$9

Infographics source: AMAT (8 Sep 21)

One zettabyte is equal to one sextillion bytes or 10<sup>21</sup> (1,000,000,000,000,000,000) bytes

# Energy efficiency is critical



Somewhere around 2040, the needs of general-purpose computing would outstrip the world's projected power generation

*Source: Decadal Plan for Semiconductors - SRC*

- The world could run out of power by 2040-2050!
- Data centres could account for 25-30% of power demand in Ireland by 2030.
- Rolling blackouts are a possibility in Ireland unless something is done.
- New processors and memory chips that consume less power are needed.

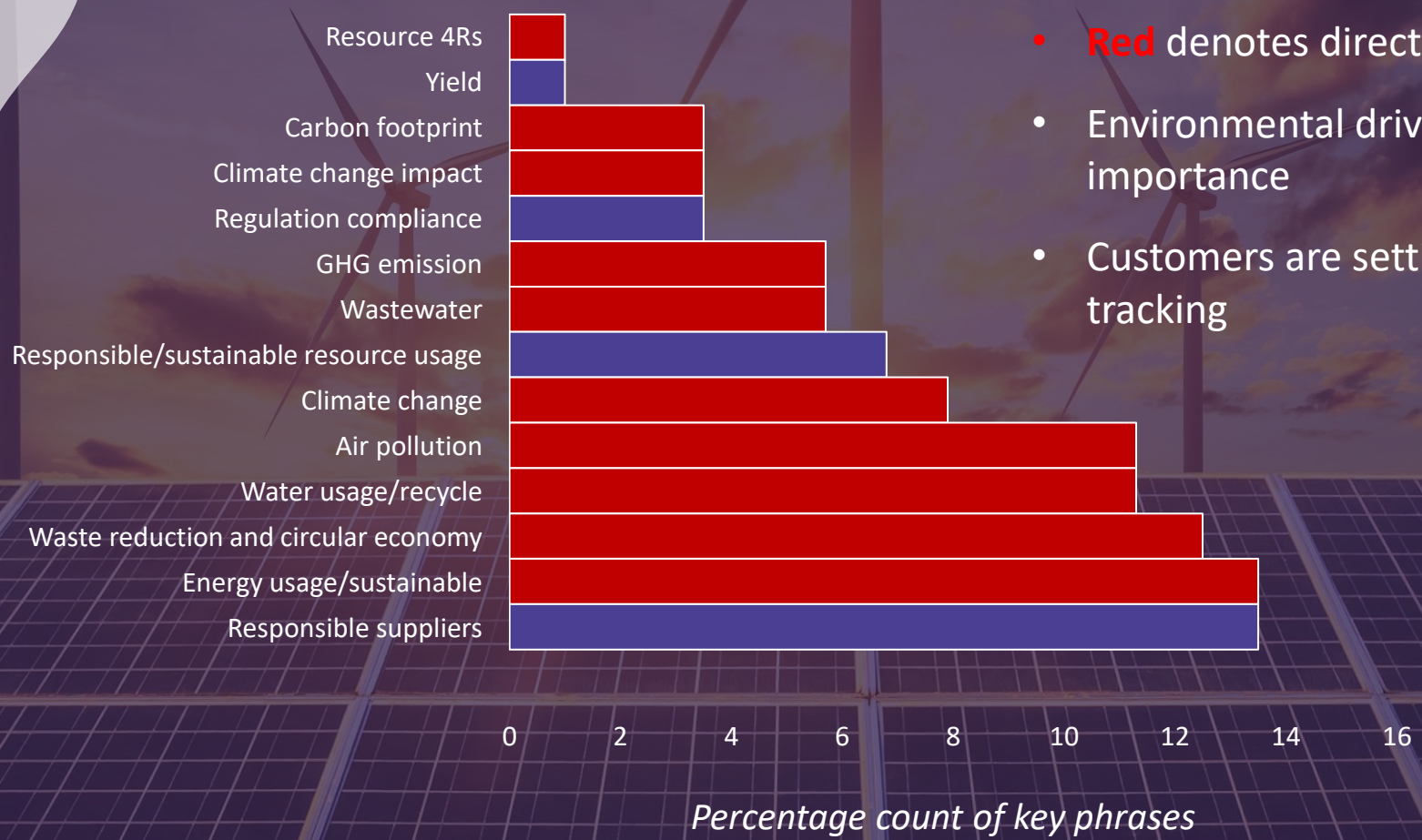
## Power cuts in Ireland due to energy intake by data centres?



EirGrid has come out with figures which show how much power data centers are consuming. In the past four years alone, EirGrid has seen demands of power increased by approximately 600GWh just from data centers, which is the equivalent of adding 140,000 households to the grid every year.



# Our challenges and opportunities



- Reviewed materiality and CSR reports from top semi companies
- **Red** denotes direct environmental phrase
- Environmental drivers gaining momentum and importance
- Customers are setting targets which we are tracking

**The computer chip industry has a dirty climate secret**

As demand for chips surges, the semiconductor industry is trying to grapple with its huge carbon footprint

Guardian, September 2021

# Edwards Semiconductor: our approach

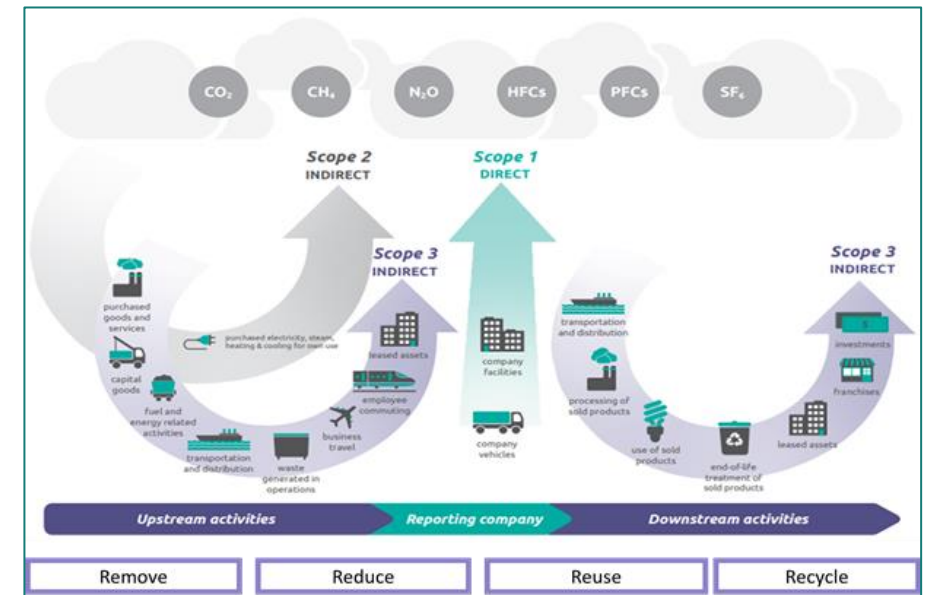
## OUR VISION

We strive to minimise the impact of the semiconductor industry on our natural world and environment we live in now and for our future.

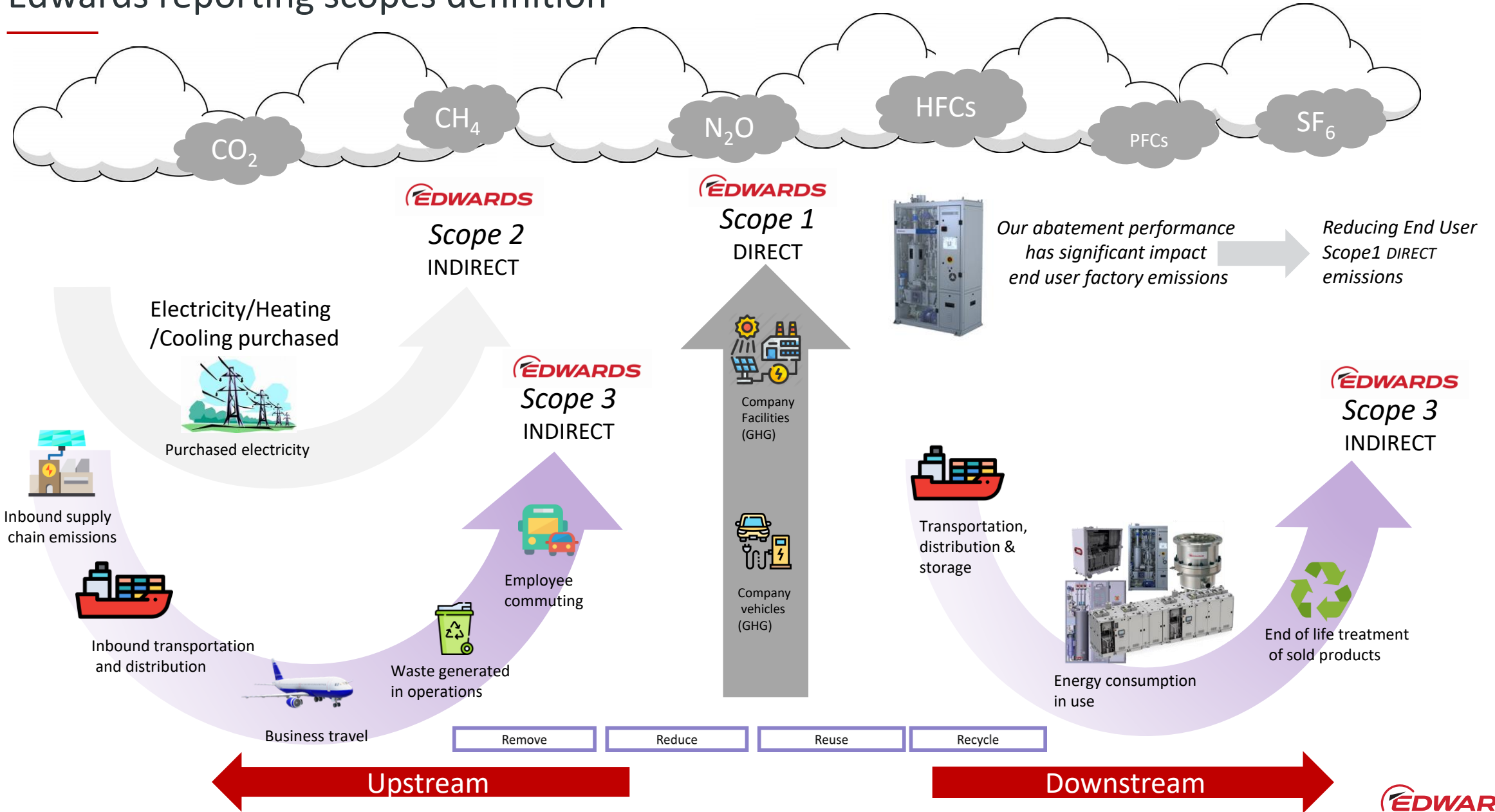
## OUR MISSION

- We apply technology, products and services that preserve the environment for future generations.
- We implement a life-cycle perspective, focused on resource efficiency and reducing pollution to a minimum.
- We will reduce our customers' environmental impact through the use of our products.
- We will reduce the environmental impact of our operations.

## REDUCING EMISSIONS THROUGH SCIENCE-BASED TARGETS

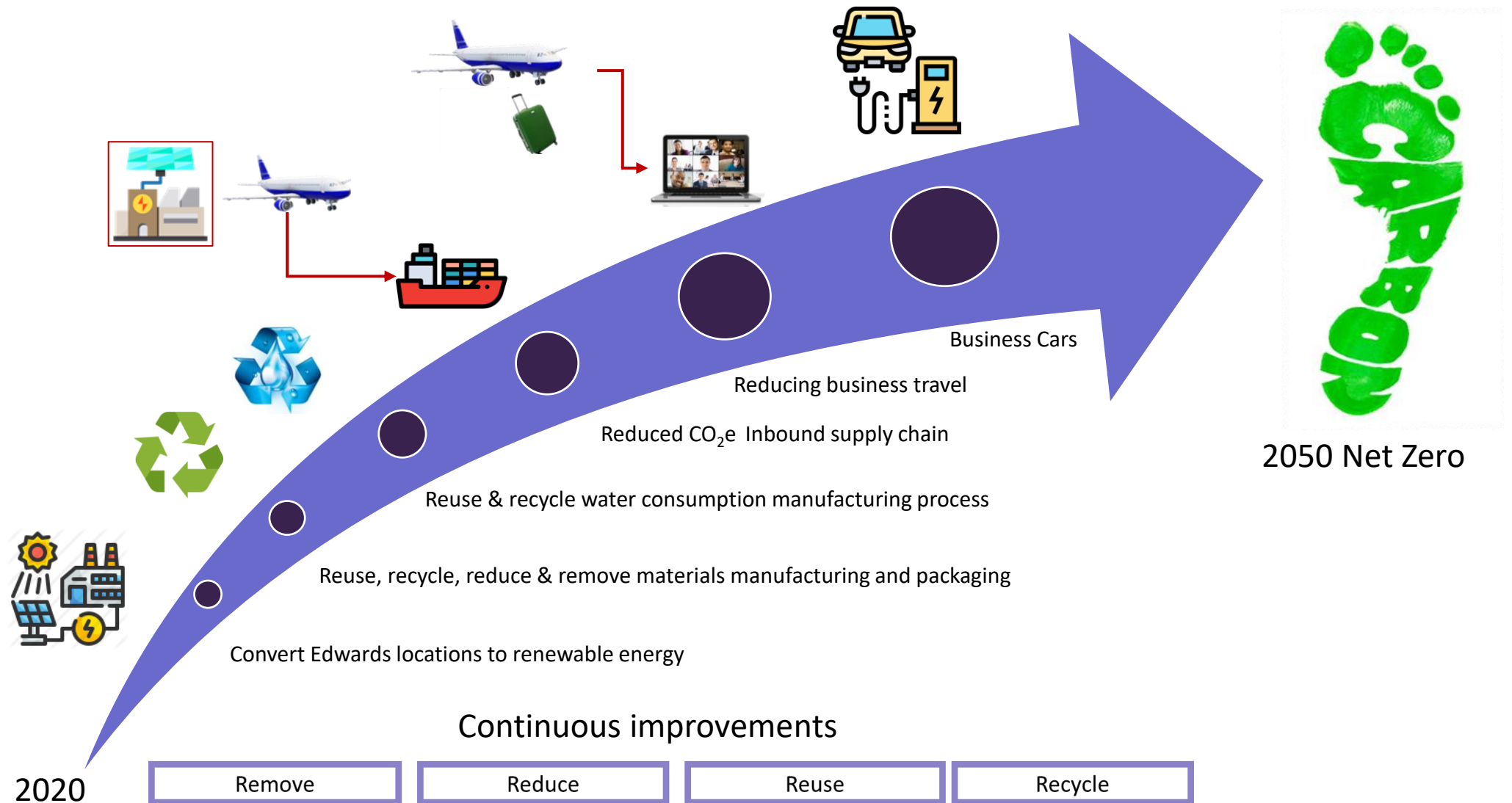


# Edwards reporting scopes definition



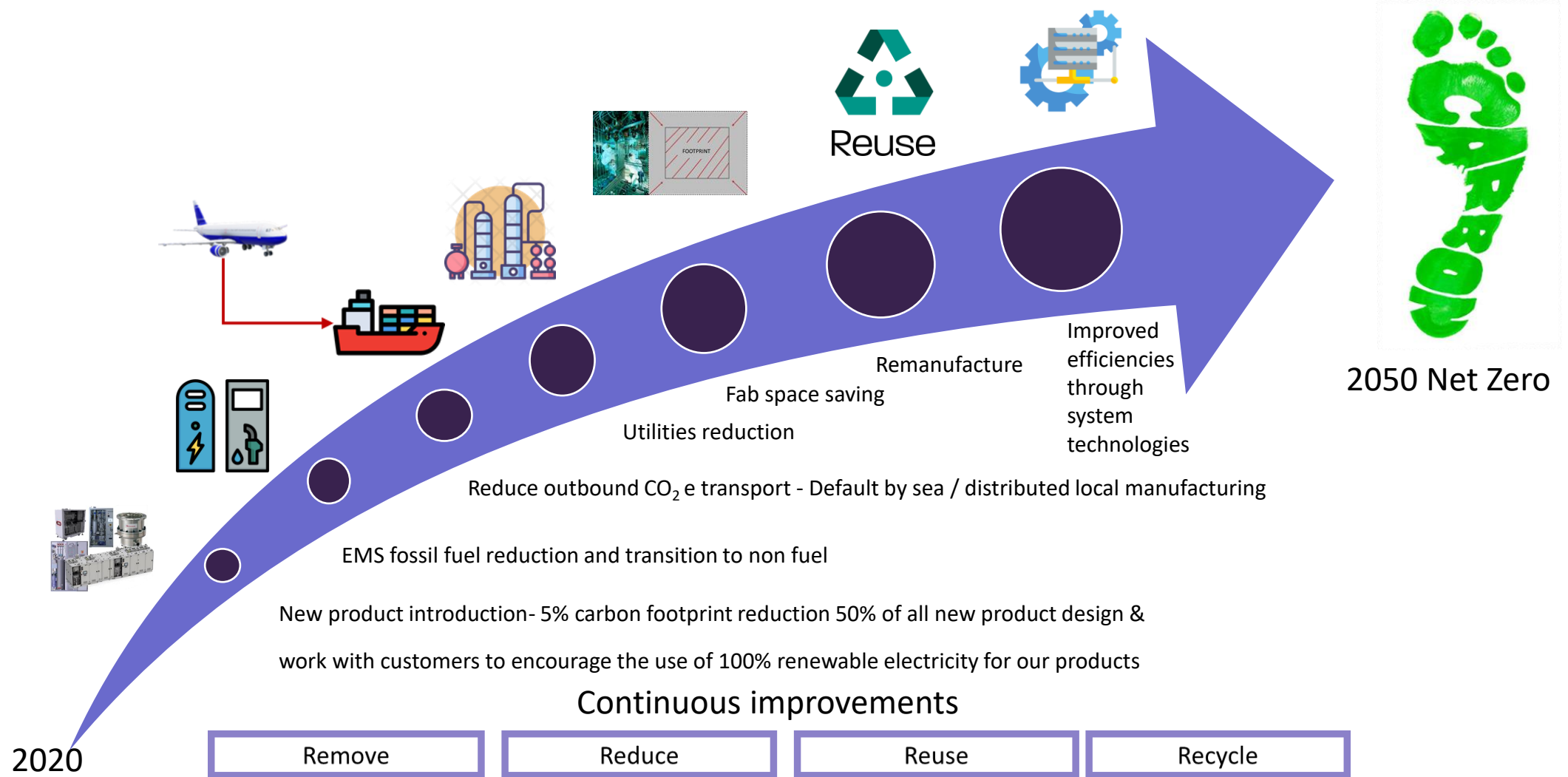


# Environmental roadmap initiatives – Edwards operations scope 1, 2, 3 (upstream)





# Environmental roadmap – Edwards product roadmap scope 3 (downstream)



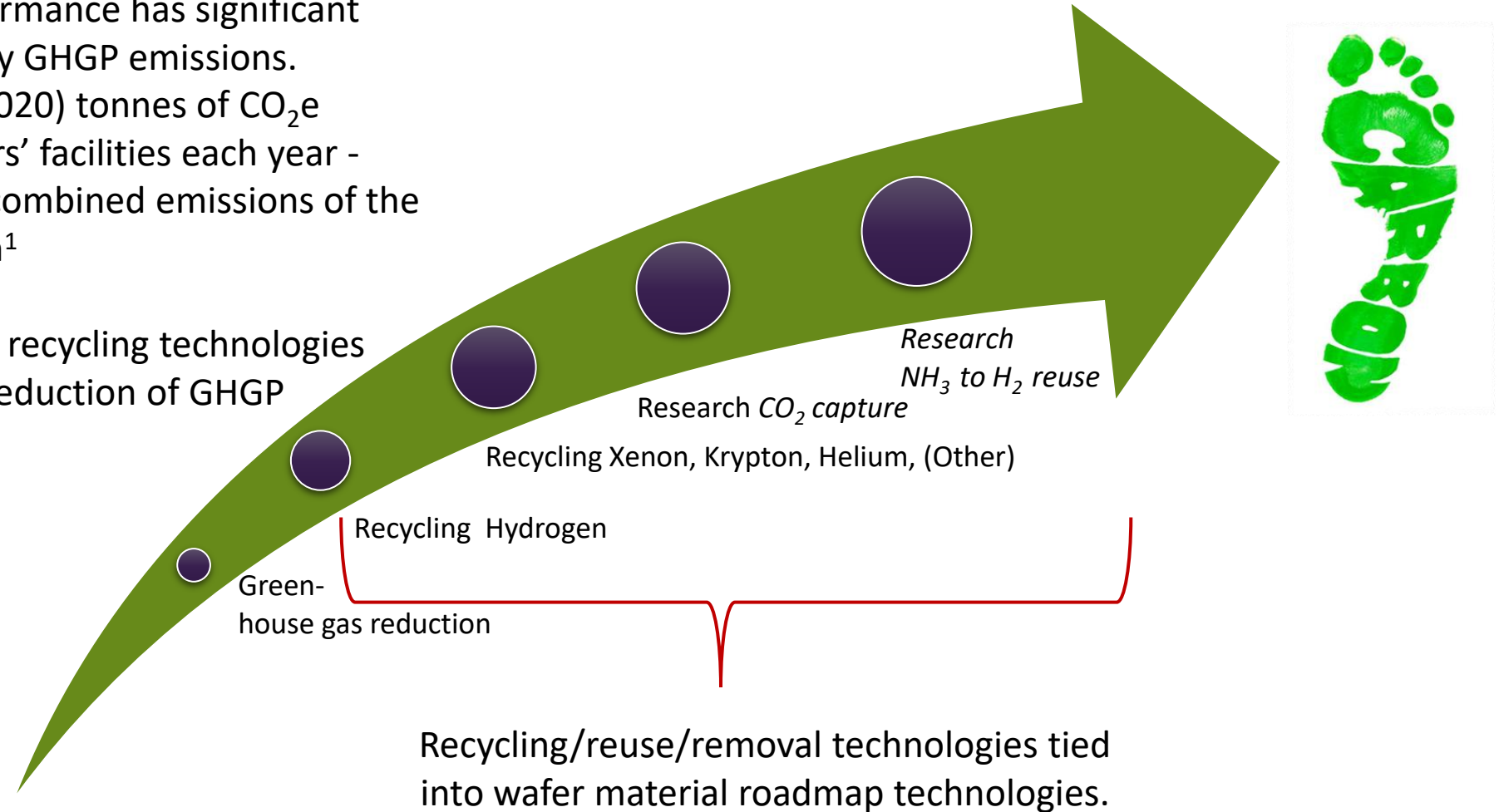
## Further reduction in end user emissions

- Edwards abatement performance has significant impact on end user factory GHGP emissions. Preventing 17.7 million (2020) tonnes of CO<sub>2</sub>e emissions at our customers' facilities each year - equivalent to the annual combined emissions of the cities of Madrid and Milan<sup>1</sup>
- Technology partnership in recycling technologies can further enhance the reduction of GHGP emissions.



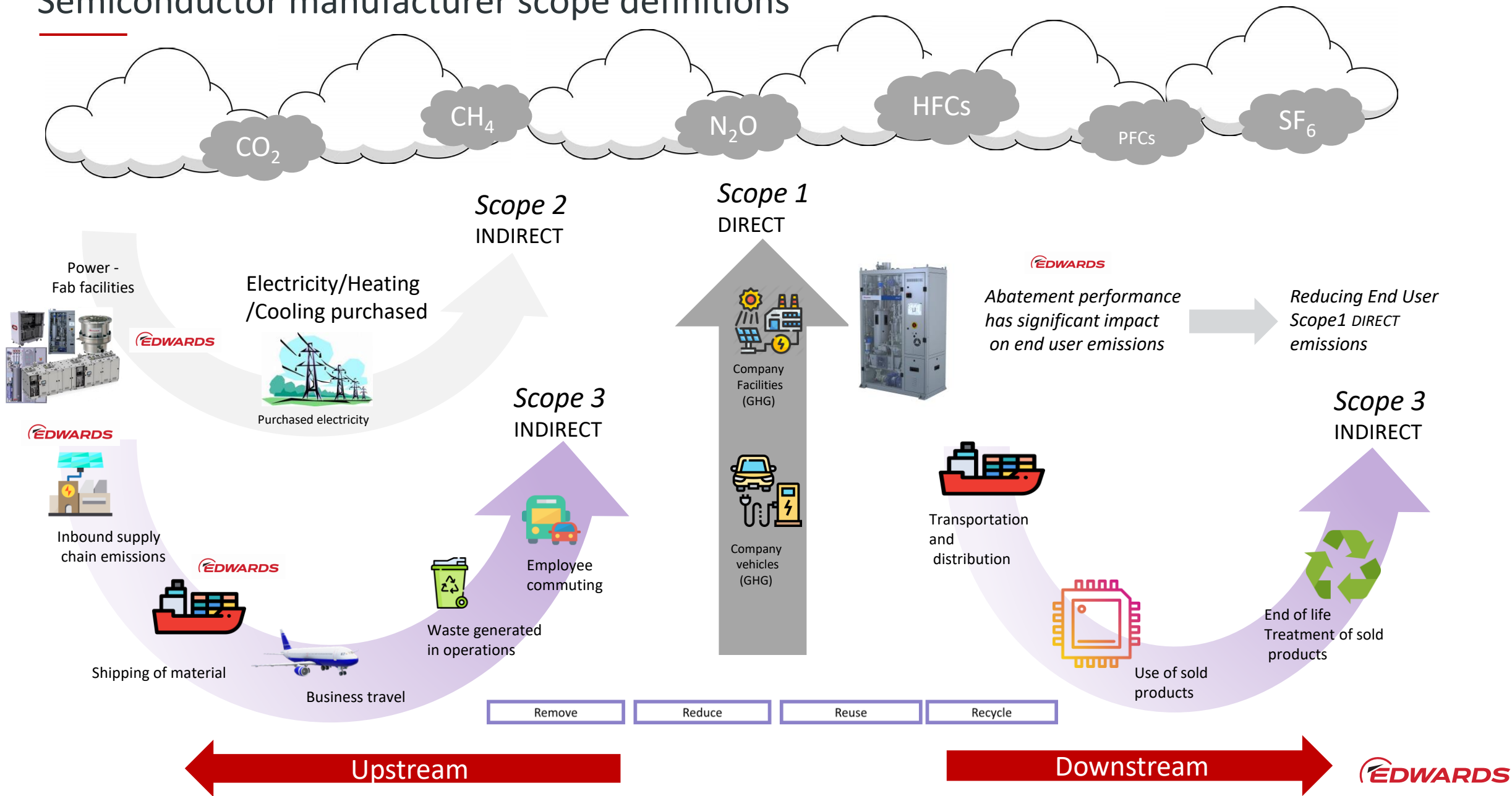
*Our abatement performance has significant impact end user factory emissions.*

Emissions





# Semiconductor manufacturer scope definitions



# SBTi Semiconductors and Semiconductors Equipment

- Our industry needs to commit to Science-Based Targets
- We can only make a truly material difference together

Name	STATUS	TARGET CLASSIFICATION
ASE Technology Holding, Co., Ltd.	Targets Set	Well-below 2°C
ROHM Co., Ltd.	Committed	-
Navitas Semiconductor Ltd.	Targets Set	1.5°C
Analog Devices, Inc.	Targets Set	1.5°C
Trina Solar Co., Ltd.	Committed	1.5°C
Sichuan Yongxiang Co., LTD.	Committed	-
Soitec	Committed	-
STMicroelectronics NV	Targets Set	1.5°C
Applied Materials	Committed	1.5°C
LONGi Green Energy Technology Co., Ltd.	Committed	1.5°C
Jiangsu Pacific Quartz Co., Ltd.	Committed	-
SCREEN Holdings Co., Ltd.	Targets Set	Well-below 2°C
KYOCERA Corporation	Targets Set	2°C
Arm Holdings	Committed	-
Advanced Micro Devices, Inc	Targets Set	Well-below 2°C



# The strategic importance of semiconductor



US President Joe Biden pledged in February to secure the United States' "critical" chip supply chains.

**USA**  
US bill: \$250 billion of government investment to increase global competitiveness in critical industries. Approximately \$52 billion is to fund semiconductor research.  
*July 2021*

**EU**  
EU aims to double semi output to get to 20% of global market by 2030. Also wants all households to have 5G by 2030. \$800B investment, \$160B earmarked for tech.  
*March 2021*

**Korea**  
South Korea government announced a plan by companies to invest \$451B and beefed-up tax benefits to boost chipmakers' competitiveness. Korea aims to become the semi leader by 2030.



South Korea is going all out to bolster its critical semiconductor industry

**China**  
China Integrated Circuit Investment Industry Fund (CICIIF) \$150 billion in state funding in support of domestic industry, state-directed overseas acquisitions, and the purchase of foreign semiconductor equipment.  
*Increased by \$28.9B in 2019*

## Collaborating for an environmentally sustainable future



- Set your Science-Based Targets



- Join forces to influence governmental policy to decarbonise the grid



- Together we can reverse climate change!





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