# Early signs of a sustainable semiconductor future

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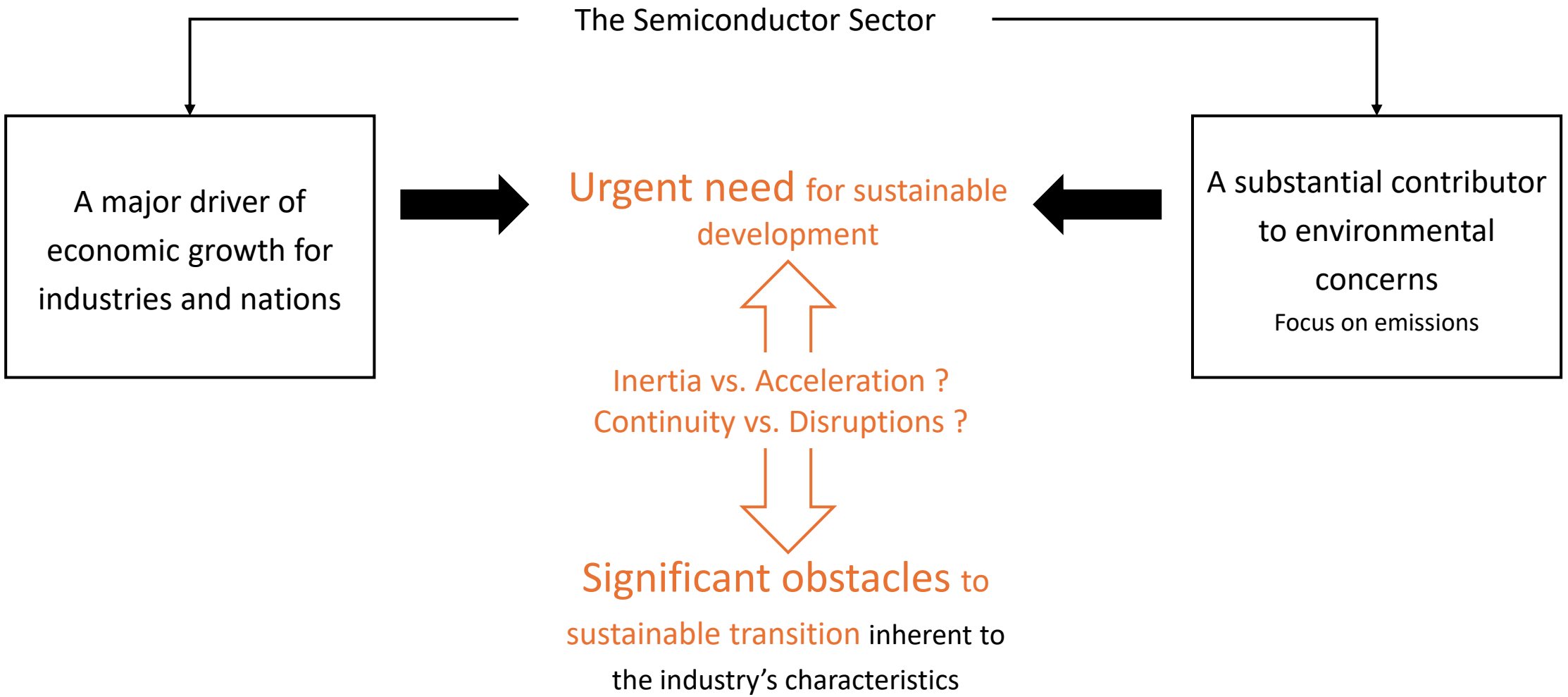
# Presentation Outline

- Setting the scene: the topic, the problem, emerging phenomena
- Framing the problem: conceptual insights
- Exploring realities: Schneider Electric’s perspective
- Conclusions

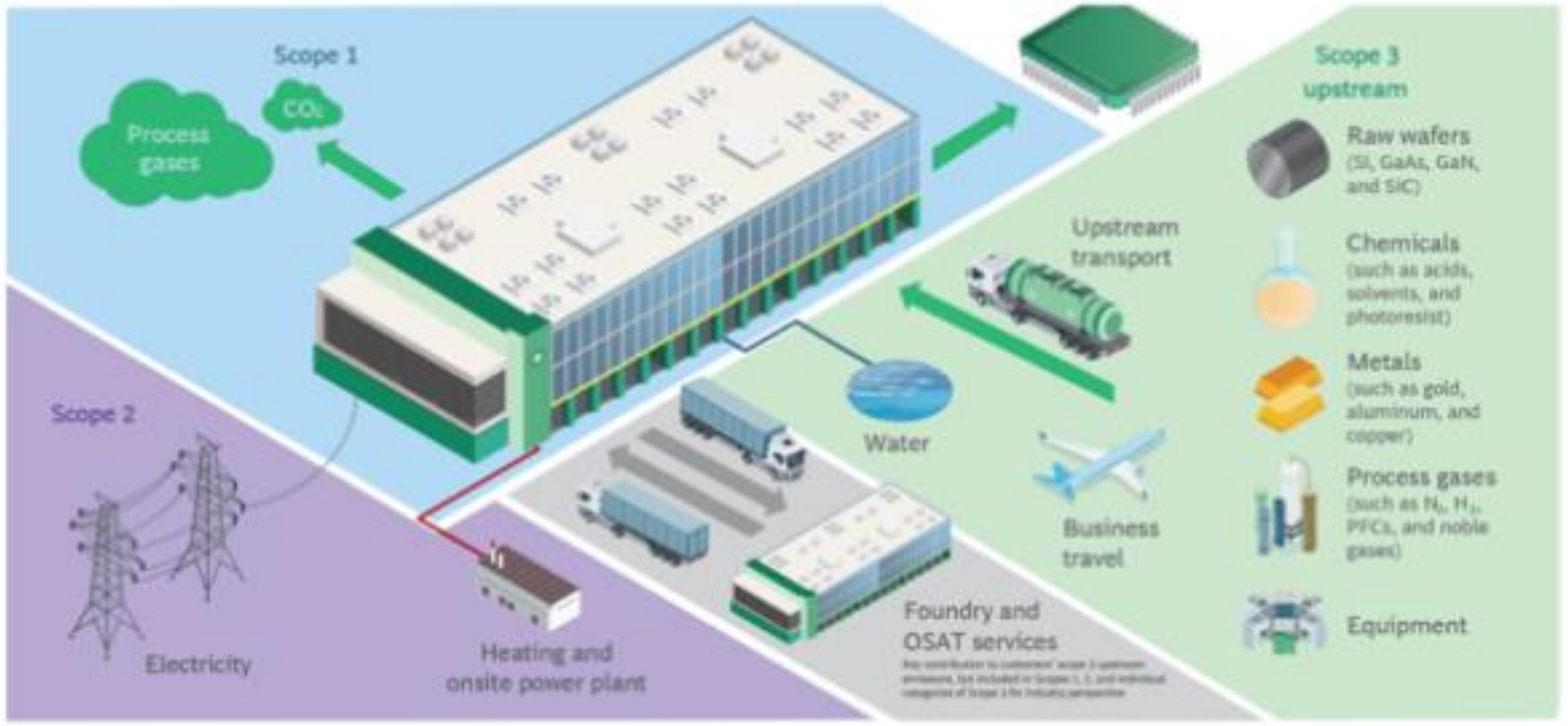
# Setting the Scene

Topic – Problem – Emerging phenomena

# Introduction of the topic



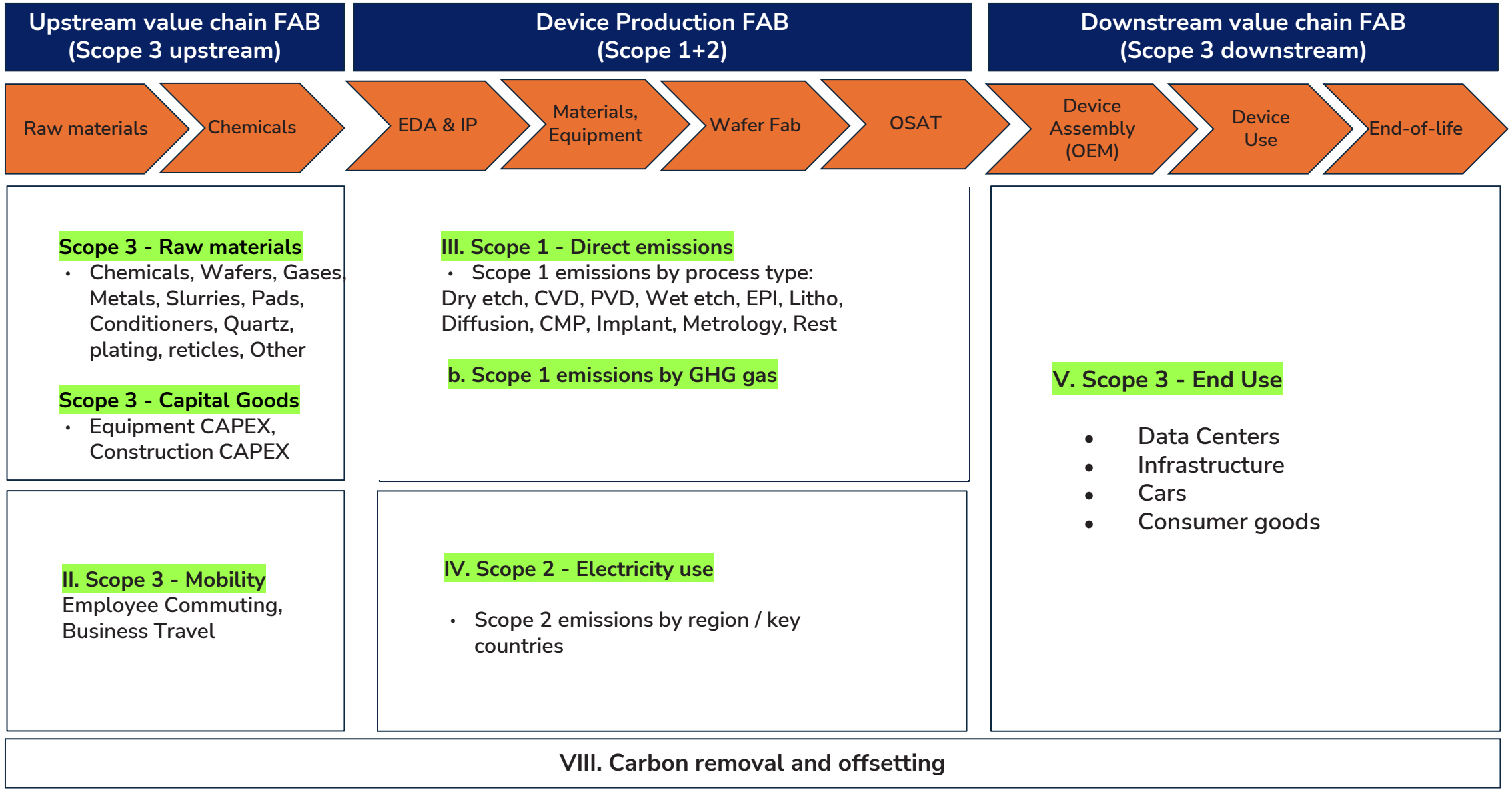
# Established view of the Semiconductor Industry's Environmental Impact




**Source:** BCG analysis.

**Note:** Si = silicon; GaAs = gallium arsenide; GaN = gallium nitride; SiC = silicon carbide; $N_2$ = nitrogen; $H_2$ = hydrogen; PFCs = perfluorinated compounds; OSAT = outsourced semiconductor assembly and test.

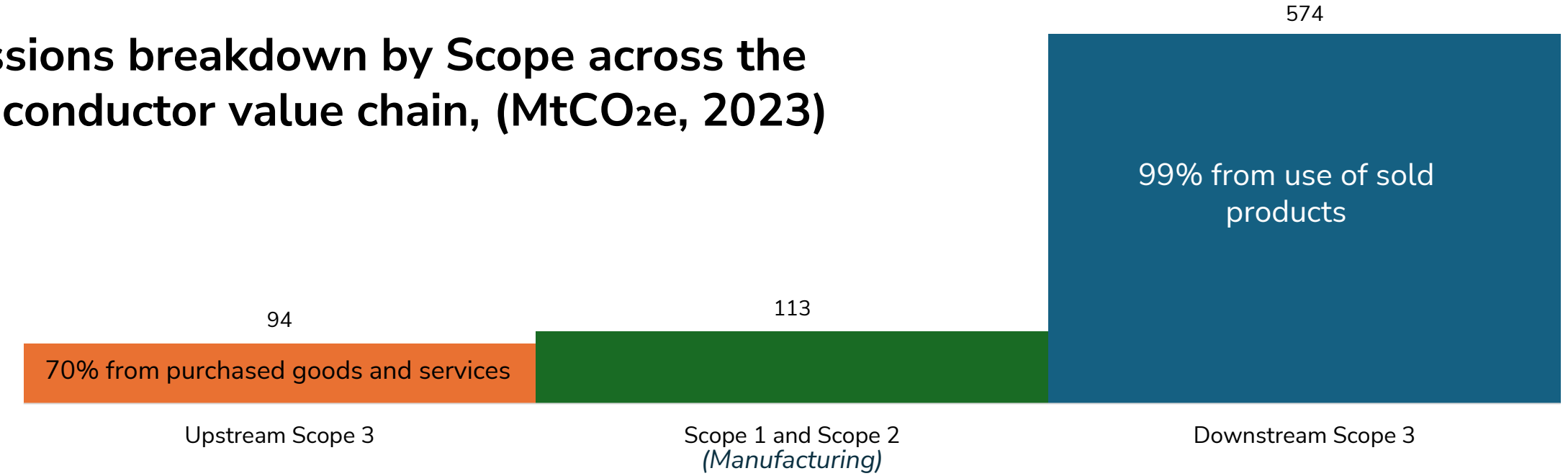
# Mapping emissions across the semiconductor value chain



# Identifying the major problem(s) within the value chain

## 73% of total semiconductor industry emissions are driven by downstream Scope 3

**Emissions breakdown by Scope across the semiconductor value chain, ($MtCO_2e$, 2023)**




| Share of total | 12% | 15% | 73% |
|---|---|---|---|

# Understanding the critical problem(s) from customers' viewpoint

## Why do we all need to discuss about environmental footprint ?

- Corporate level
  - In most companies carbon accounting for scope 1 & 2 is calculated and disclosed
  - Scope 3 is still a challenge
  - Carbon Disclosure Project becomes a must have

- Product level
  - One customer is one Excel sheet
  - Data need to be computed the same way with an acceptable level of transparency & comparability
  - Need to be actionable
  - One day, consumers hopefully will care

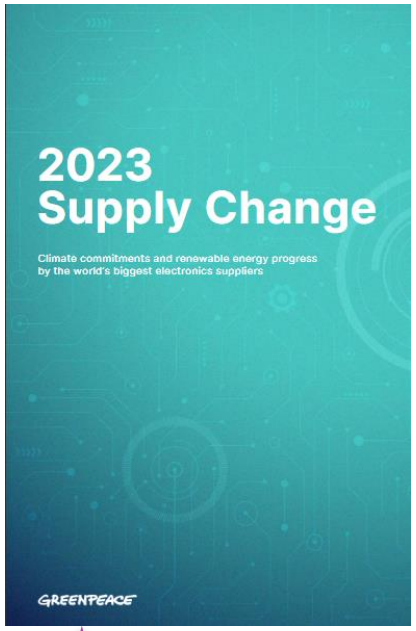
# The emergence of influential stakeholders in the value chain

**influential stakeholders:** actors capable of compelling their supply chain partners to heed their sustainability-driven requests

- Amazon
- Google
- Apple
- Greenpeace
- Semi

**Accelerating forces ?**

**Disruptive forces ?**






semi | Semiconductor Climate Consortium

# Framing the problem: conceptual insights

*Sustainability initiatives of certain actors diffuse throughout their supply chain enhancing the performance of their key suppliers and customers*…(Tian et al. 2025)

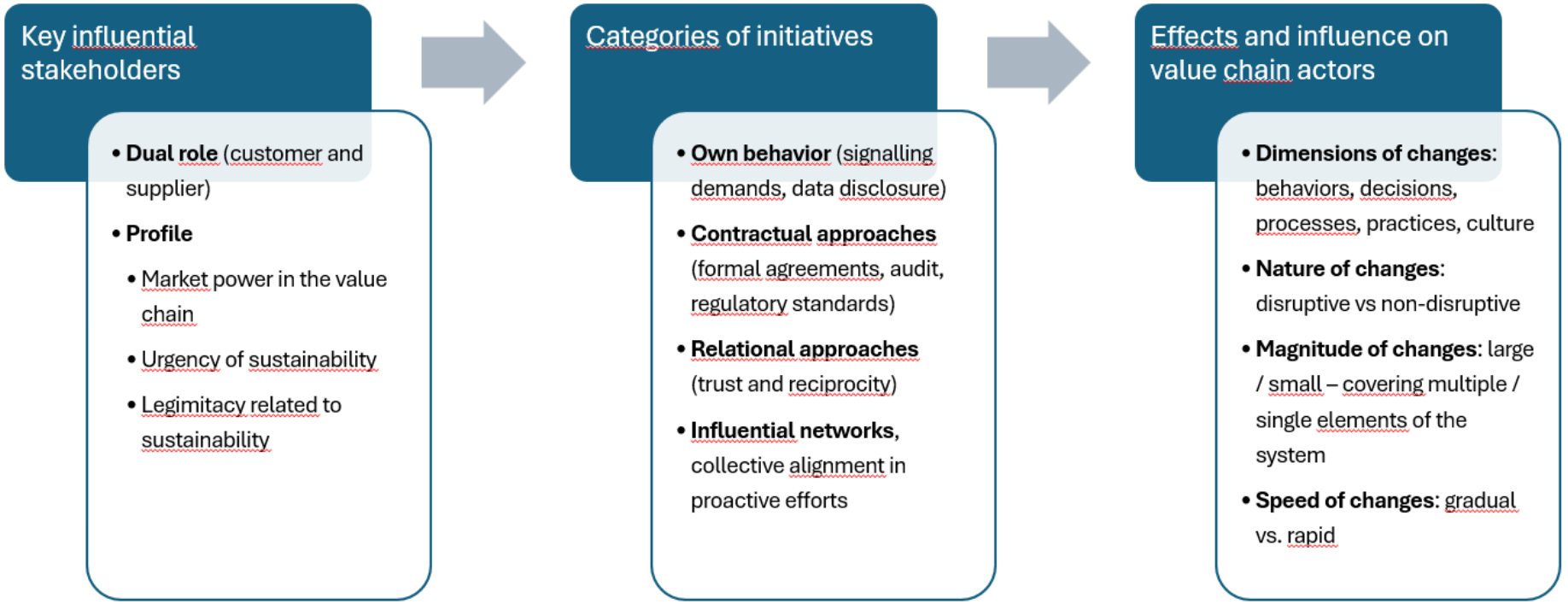
potentially triggering transitional disruptions in transition.

# The pivotal role of certain actors in influencing sustainable development

Key semiconductor manufacturing companies play a pivotal role in shaping the industry's dynamics.

## Which firms could take the lead in accelerating sustainable development – emission reduction activities ?

Framework for Observing Early Signs from Influential Stakeholders




Figured by authors, inspired by: Tian et al. (2025): Sustainability diffusion in the Chinese semiconductor industry: A stakeholder salience perspective, International Journal of Production Economics, 279 109470

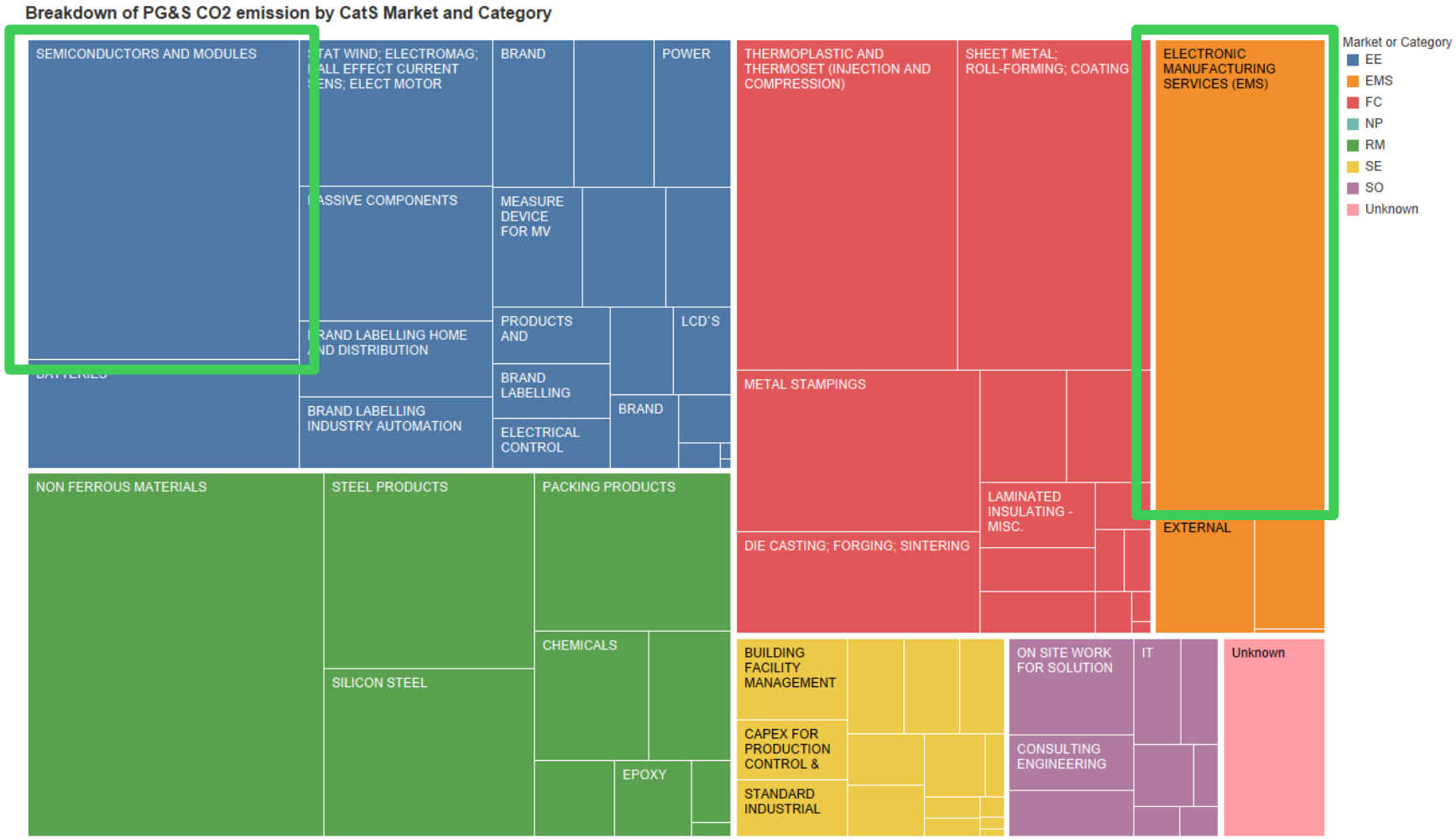
# Exploring realities: Schneider Electric's perspective

Real order of magnitude

# Electronics and Schneider Electric's emissions (2024)

| Suppliers *Scope 3 upstream* | Operations *Scopes 1 and 2* | Customers *Scope 3 downstream* |
|---|---|---|
| **8.0 million $tCO_2$** | **0.14 million $tCO_2$** | **47.6 million $tCO_2$** |
| **Key category**<br>Purchase of goods (incl. raw materials), capital goods and services<br>**6.7 million $tCO_2e$**<br>Share from EE + EMS = **2.50 million $tCO_2e$**<br>Of which semiconductors >30% | **Scope 1**<br>Fossil fuel combustion in sites and vehicles<br>$SF_6$ leakages<br>**Scope 2**<br>Electricity and heat consumption | **Key category**<br>Use of sold products<br>**42.6 million $tCO_2e$**<br>Scope III downstream have reduced 2.8% year over year since 2021. Electronics are a key enabler |
| **2030 SBTi Targets** *25% reduction* | *76% reduction* | *25% reduction* |

# Electronics and Schneider Electric's upstream emissions



# Supplier PCF can showcase emission reductions at product & corporate levels

**Forecast & Report**

Business prioritization | Engineer | **Source** | Plan | Manufacture | Deliver | Use | Re-use/ Dispose

*Process description & rationales*

**Collect primary part-level data from suppliers/ sourcing**

Primary data is collected from suppliers as much as possible

- *Part PCF/ EPD*
- *Manuf. Process (e.g., furnace)*
- *Industry certifications (e.g., LESS, SEMI, etc.)*
- *Part emissions using secondary data*

**Map Part to corresponding Commercial Reference (CR)**

Primary and secondary data backed part emissions are mapped to the commercial reference via the MBOM[1] and summed together

⚠ Critical step to connect what we buy & sell

**Showcase Product & Corporate GHG emissions reductions**

- *PEP*
- *Scope 3 carbon accounting*

SE Products using low carbon parts from Suppliers have **reduced carbon footprint in PEP**

SE Products using low carbon parts from Suppliers contribute to **reduced emissions for "Purchased Goods & services"**

*Illustration/ example*

ArcelorMittal

**Steel Sheets**

Schneider Electric

**PanelSeT SFN**

**Customers/ regulators** through environmental program and Environmental Data Platofrm (EDP)

⚠ **Beyond carbon, EDP could also capture other attributes** (e.g., recycled content) to fully reflect environmental performance.

Life Is On Schneider Electric

# SCC Ambition Statement (Rev 2)

**The SCC ambition statement articulates our Vision to accelerate progress as an industry through the power of collaboration. It is intended to complement – not replace – the unique sustainability goals of each SCC member, each guided by its own Net Zero strategy and roadmap.**

## Emissions[1]

SCC aspires to help members achieve Net Zero GHG emissions[2] no later than 2050 with an aspiration for following short-term milestones:

1. Scope 1 Emissions: 43% reduction from 2019 levels in 2030[3], aligning with the Paris Agreement 1.5 °C pathway[4]
2. 2040: 100% Low Carbon Electricity (LCE)[5] in APAC [75% by 2030] where regionally available
3. 2030: 100% Low Carbon Electricity in EU and Americas

## Transparency

4. > 95% of members publicly report Scope 1 & 2 emissions by the end of 2027 and relevant Scope 3[6] emissions by the end of 2028
5. By 2028, develop a methodology and reporting framework along our value chain[7] that enables exchange of relevant and reliable Product Carbon Footprints (PCF)

[1] Energy efficiency target to be defined.
[2] As per GHG protocol.
[3] Following the IPCC 2019 guideline.
[4] Companies that achieved >43% emissions reduction before 2019 or began with a low emissions baseline due to early use of abatement systems may already be well aligned with the intent of this statement.
[5] Includes renewable energy technologies, and nuclear power, aligned with CDP Climate Change 2023 Reporting Guidance and IEA.
[6] Defined according to the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard.
[7] Semiconductor manufactures, materials and chemicals suppliers, and equipment manufacturers.

# Conclusion

Early signs of a sustainable semiconductor future and their implications

# Early signs of a sustainable semiconductor future and their implications

**Lead semiconductors' customers engaging their supply chain towards more sustainable sourcing**

- Sense and seize their strategies, their initiatives and their impact (new rules, shifts in suppliers, disruptive forces ?)

**Focus  on critical challenges influencing sustainability dynamics**

- Data, measures (methods and standards), evolving demand and purchasing behaviors

**Collaborations along the whole value chain**

- Set clear expectations and adopt a proactive approach by implementing sustainability disclosure practices and initiatives

**Uniform adoption of sustainability standards to avoid competition distorsion**

- Effects of regional policies and preferences


# Thank You