



From Carbon Footprint to the Future: CO₂ Compliance as a Mandatory Entry Ticket to Markets, Customers and Financing

Webinar – Part 1



Today's Webinar Content Is Brought to You by Presenters From AVL and Strategy Engineers (SE)




Today's Presenters



Matthias Fail

 Senior Product Manager

 >20 yrs. of experience

 Product cost optimization, lifecycle emission analysis


 matthias.fail@avl.com



Arndt von Gregory

 Principal

 >20 yrs. of experience


 Transformation strategy, organisation, product profitability

 avg@strategyengineers.com



Hans Beck

 Principal

 >8 yrs. experience

 Product strategy, environmental sustainability

 hcb@strategyengineers.com

Today's Webinar Is Part of a Series – Today, We Will Focus On Regulation and CO₂ Compliant Strategies

Introduction of Webinar series and content

Webinar 1



From Carbon Footprint to the Future: CO₂ Compliance as a Mandatory Entry Ticket to Markets, Customers and Financing

Date:
May 16th 2023 (today)

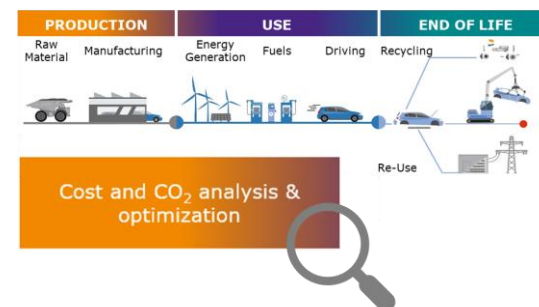
Webinar 2



Design to CO₂: Reality Check
Limited number of participants.
Registrations only via
energy@avl.com

Date:
June 13th, 12.00 CET

Webinar 3



Cost- and CO₂-Management
Will be an interactive session,
also based on inputs from
participants from the 1st and
2nd session

Date:
Planned in September 2023

SE Is the Management Consulting of the Avl Group – Together, We Create a Unique Offering to Our Clients



SE & AVL Offerings



Agenda

- 1 Introduction of webinar content
- 2 Why & in how far are CO₂ emissions relevant for companies?
- 3 What CO₂ regulation is in place & how does CO₂ relate to product cost?
- 4 Conclusion: What do companies have to do to cope with increasing requirements?
- 5 Q&A
- 6 Outlook



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Numerous Companies Have Announced to Become Carbon Neutral Between 2030 and 2040

Road to Net Zero – Corporate Announcements

Porsche Newsroom / 2021 / Company / Porsche aims for CO₂-neutral balance sheet in 2030

Porsche aims for CO₂-neutral balance sheet in 2030

18/03/2021 | Porsche AG has set itself an ambitious goal: in 2030, the company wants to have a CO₂-neutral balance sheet across the entire value chain. The Executive Board of Porsche AG provided information on this at the annual press conference.

FORD TAKES NEXT STEPS TOWARDS CARBON NEUTRALITY IN EUROPE BY 2035 – SIGNS MOUS WITH KEY SUPPLIERS TO SECURE DELIVERY OF LOW CARBON STEEL

25-OCT-2022 | COLOGNE, GERMANY

Newsroom:

General Motors, the Largest U.S. Automaker, Plans to be Carbon Neutral by 2040

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- GM plans to be carbon neutral^a by 2040 in its global products and operations
- GM aspires to eliminate tailpipe emissions from new light-duty vehicles by 2035
- GM has committed to the Business Ambition Pledge for 1.5°C

Siemens is leading the way towards carbon neutrality

With our firm commitment to become carbon neutral by 2030, we take leadership in decarbonization. At the same time, we help our customers meet their individual decarbonization goals.

UPDATE
October 25, 2022

Apple calls on global supply chain to decarbonize by 2030

The company accelerates work with suppliers to decarbonize Apple-related production, and expands investments in clean energy and climate solutions around the world

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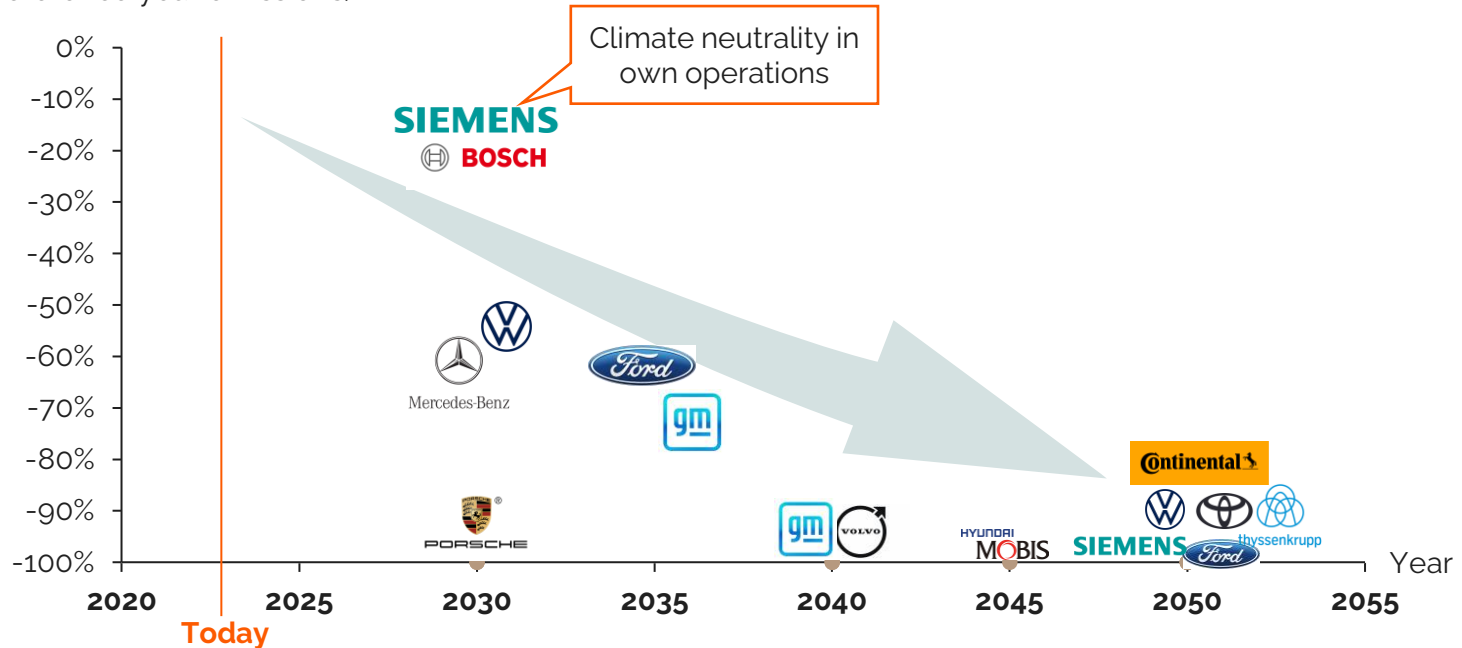


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Most Companies Aim for Carbon Neutrality in 2050 – Some With an Interim Climate Neutrality in Own Operations as Interims Target for 2030

Emission Reduction Announcements of Selected Companies

Net Emission reduction target^{1) 2)}
(in % of reference year emissions)

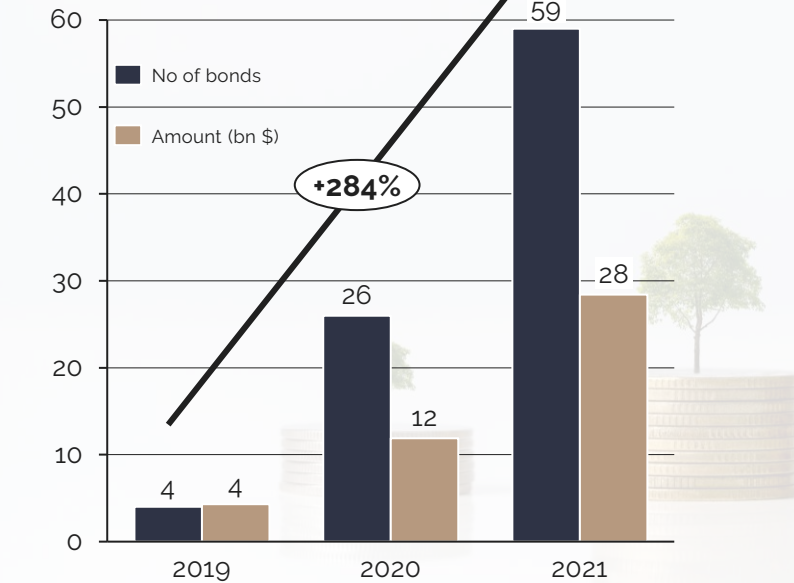


¹⁾ Including up- and downstream emissions in supply chain and use phase of products, ²⁾ Net emissions include the option of carbon offsetting

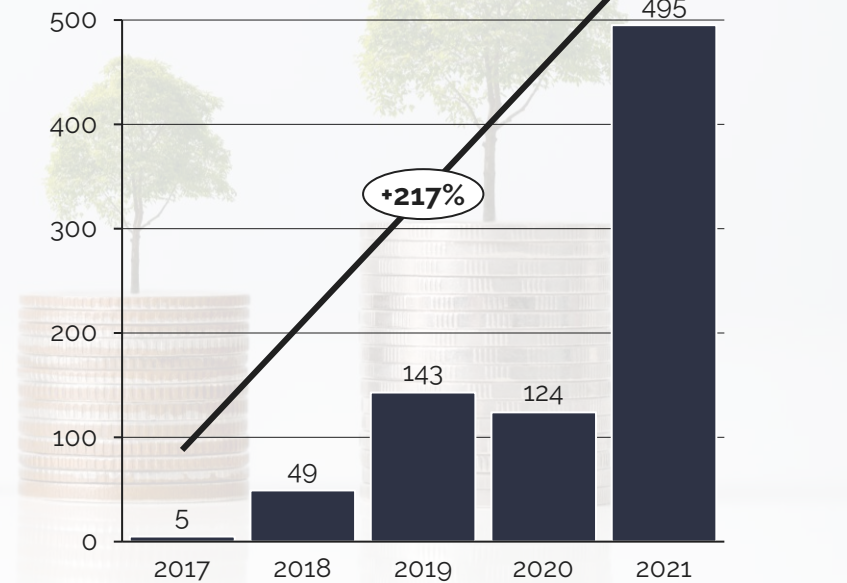
Carbon Footprint of a Company Becomes Relevant for Enterprise Financing

Importance of Carbon Neutrality for Financing

Sustainability linked bonds¹ globally (No / bn\$)

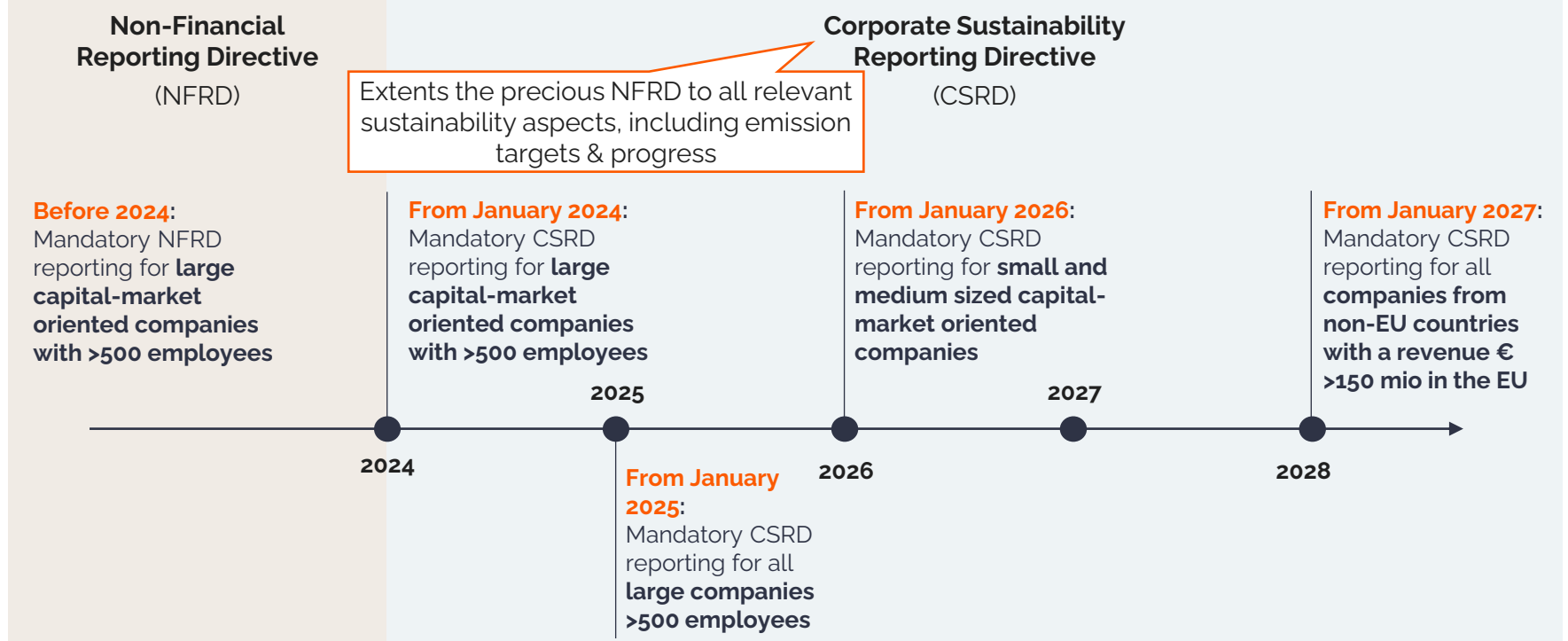


ESG-linked loans² globally (bn \$)



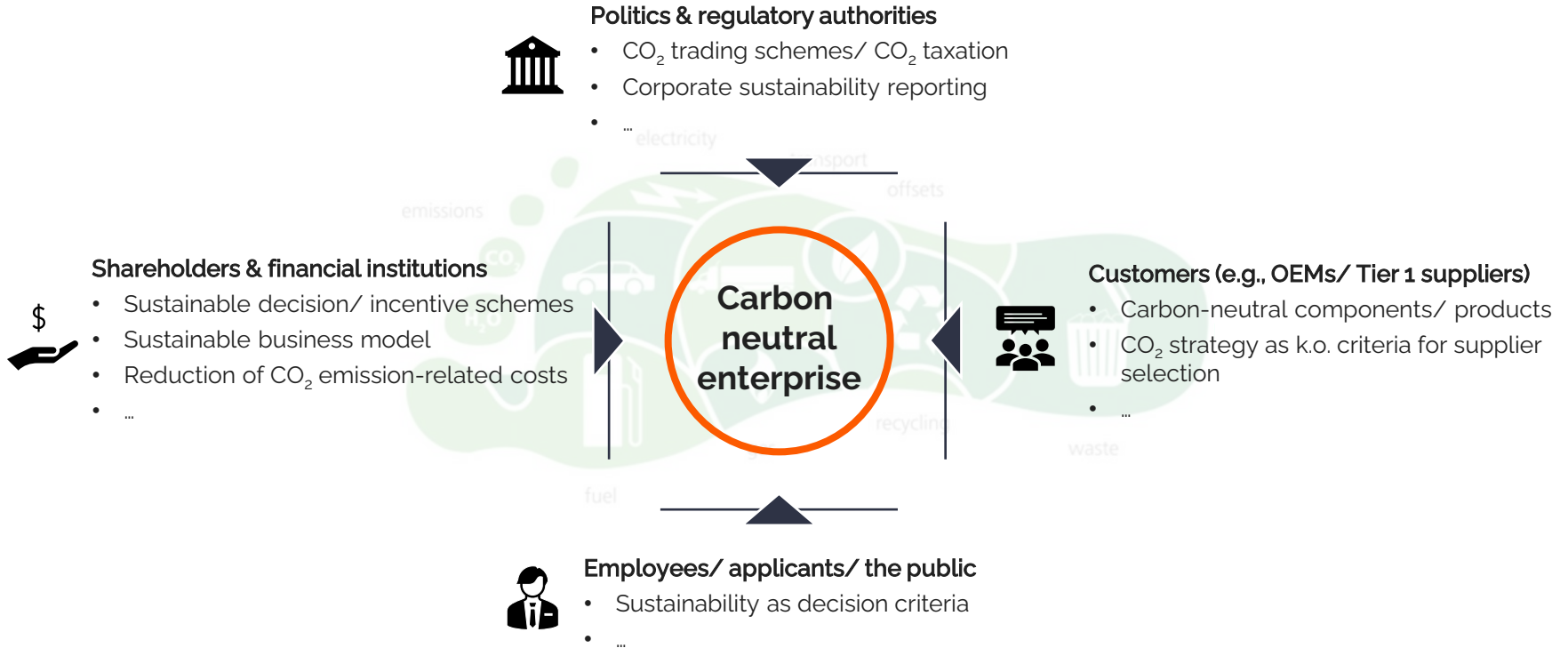
Another Driver Is Regulatory Push, e.g. The Renewed Corporate Sustainability Reporting Directive of the EU

Regulatory Push – Example EU: Introduction CSRD



The CO₂ Footprint Is Not Only a Cost Factor, but Is Increasingly Becoming an Entry Ticket to Markets and Access to Financing

Stakeholders for CO₂ Footprint Reduction



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 - 3.1 Where do what CO₂ emissions arise?
 - 3.2 Which is the relevant regulation today & in future?
 - 3.3 How do CO₂ emissions relate to product cost?
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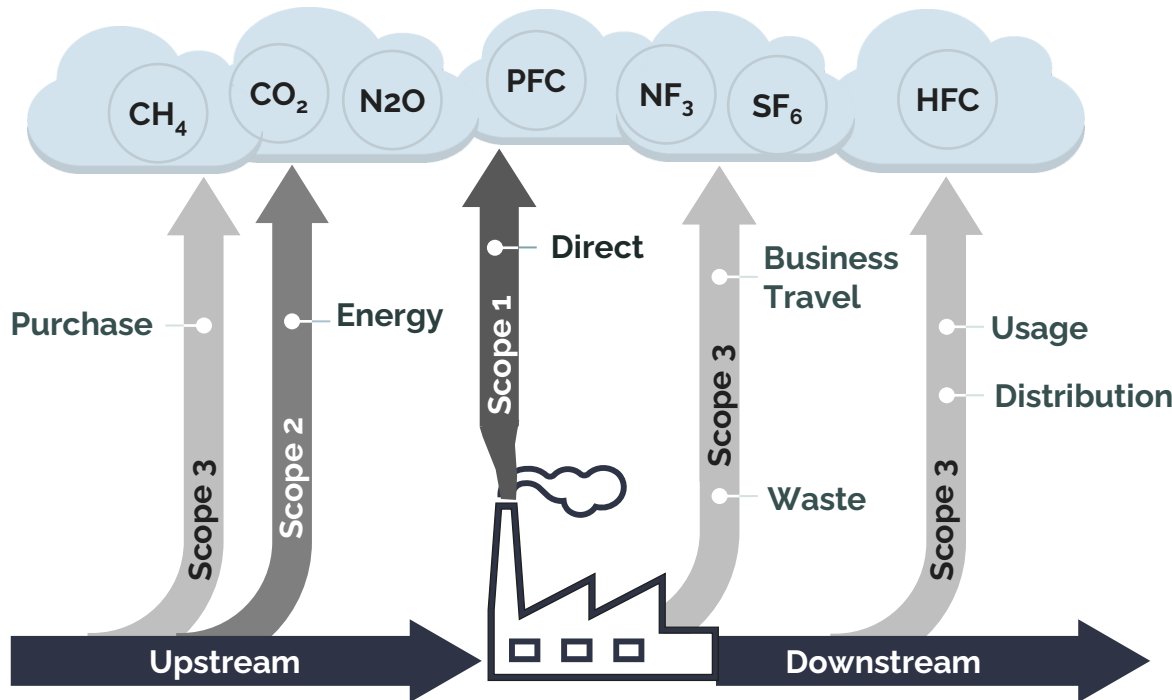
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The Greenhouse Gas Protocol Distinguishes Direct & Indirect Emissions Categorising Into Scope 1, 2 & 3

Classification of emissions

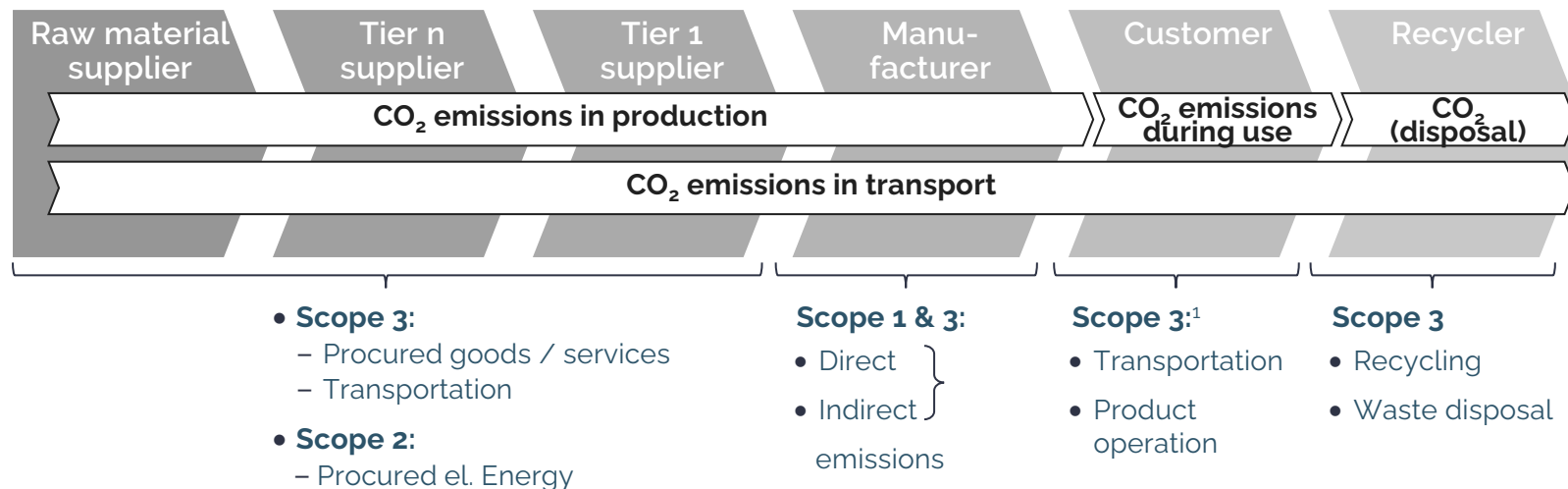


Scope definitions:

- **Scope 1**
Direct GHG emissions from sources controlled by the company
- **Scope 2**
Indirect GHG emissions (electricity, steam, heat, or cooling)
- **Scope 3**
All **indirect** GHG emissions within the value chain

By Far the Largest Share of Emissions Falls Under Scope 3 and Includes All Upstream and Downstream Activities

Emission scopes can be mapped onto the different stages of the value chain



1) Emissions in use phase not directly addressable

Only a Fraction of Automakers' Emissions Are Scope 1 So They Will Have to Choose Their Suppliers Carefully to Be Able to Comply With Their Targets



Overview of CO₂ emissions of selected OEMs and suppliers

	BMW	Mercedes-Benz	Bosch	
Total emissions (in mio t)	118,501	73,562	455,458	
Of which in use phase	98,782 (83%)	54,600 (74%)	415,540 (91%)	
Of which directly addressable	19,719 (17%)	18,962 (26%)	39,918 (9%)	
Scope 1				
	3.4%	5.4%	1.2%	
Scope 2				
	0.7%	5.5%	7.0%	
Scope 3	Procured goods & services	82.4%	81.7%	74.0%
	Disposal	5.8%	5.3%	0.1%
	Other indirect emissions	7.7%	2.1%	17.7%
	Total Scope 3	95.9%	89.1%	91.8%

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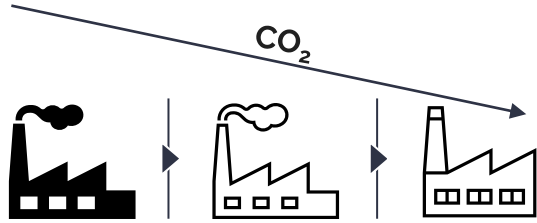
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Carbon Pricing Schemes Are the Major Tool for Countries to Achieve Their Targets

Current regulation & systems to reduce CO₂ emissions

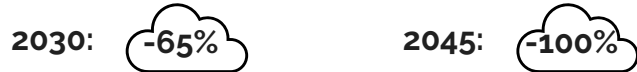
Carbon reduction targets



European Union: EU Climate Change Act (spring 2021)



Germany: Federal Climate Protection Act (18.8.2021)



negative emissions

Carbon pricing schemes



Emission Trading Systems (ETS)



25 ETS in place

22 further ETS planned



Globally **pioneer** since **2005**
covering **40%** of all emissions



DE-system covering **additional sectors**

CO₂ taxation



20 CO₂ taxation systems in place

Emissions Trading and Carbon Tax Are Two Well-Established Instruments to Put a Price on GHG Emissions

Emissions Trading and Carbon Tax



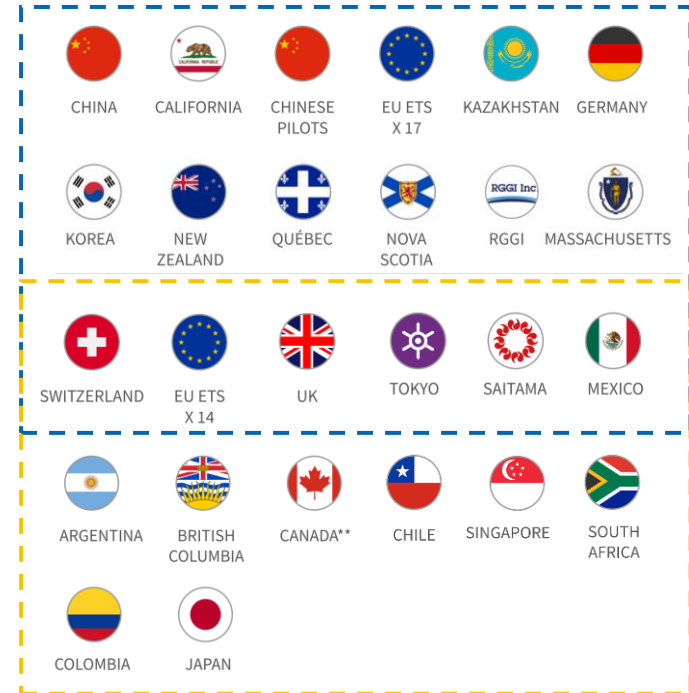
Emissions Trading

- Companies are obliged to **obtain & surrender** enough **allowances** to cover their emissions
- The **supply** of allowances **is capped**



Carbon Tax

- The government **imposes a fixed tax rate** on the emission of CO₂



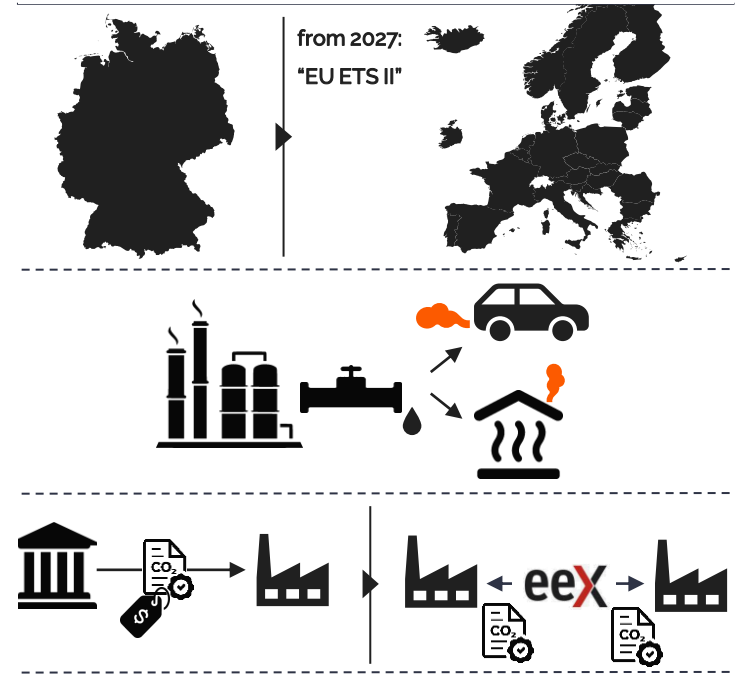
In Germany, There Are Currently Two Separate Systems in Place Side-By-Side

EU ETS and German nETS

EU Emissions Trading System (EU ETS)



German National ETS (nEHS)

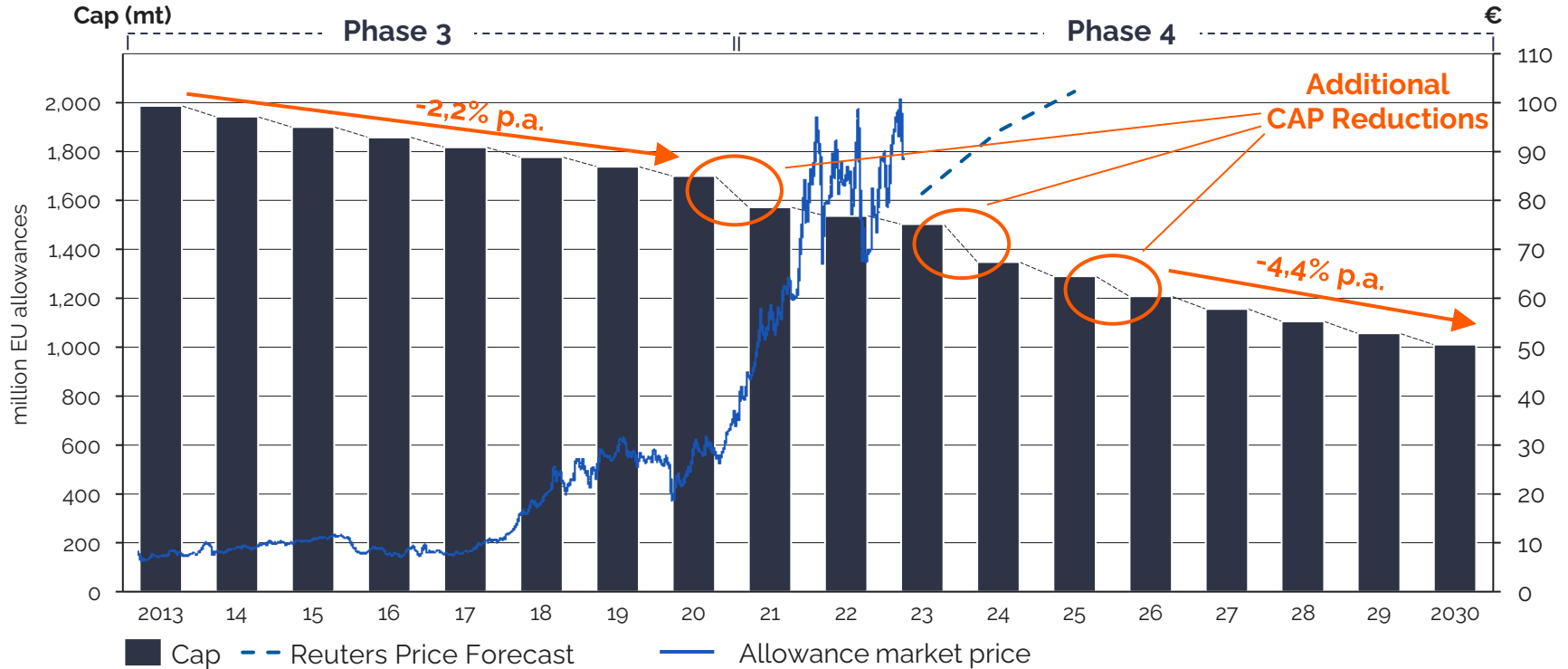


 covered emissions of each ETS

The German nETS has a mechanism (Cross Sectoral Correction Factor) in place to exempt all emissions from installations that are already covered by the EU-ETS. Geographical position of Iceland is not accurate on either figure.

With Declining Supply, Allowance Prices Have Exploded in the Past Years

Emitted Allowances in the EU Emissions Trading System 2013 - 2030



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Note that for phase 3, the approximate number of allowances into the UK has been subtracted from the total cap.
 *EU Allowance

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CO₂ Emissions Can Be Determined From the Company's and the Product's Point of View

Corporate vs. Product Carbon Footprint

Corporate Carbon Footprint

Top-down:

- Assessment of company-wide, overarching CO₂ emissions

Bottom-up:

- Calculation of CO₂ emissions of purchased components of selected products
- Extrapolation to entire product range to determine supply chain emissions



Scope 1 emissions

Stationary combustion
Mobile combustion
Fugitive emissions

Scope 2 emissions

Purchased electricity and energy

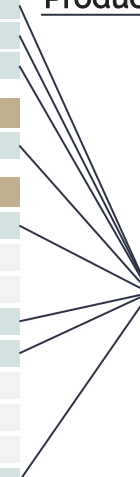
Scope 3 emissions

Purchased goods and services
Capital goods
Fuel and energy-related activities²⁾
Upstream transportation and distribution
Waste generated in operations
Business travel
Employee commuting
Upstream leased assets
Downstream transportation and distribution
Processing of sold products
Use of sold products
End-of-life treatment of sold products
Downstream leased assets
Franchises
Investments

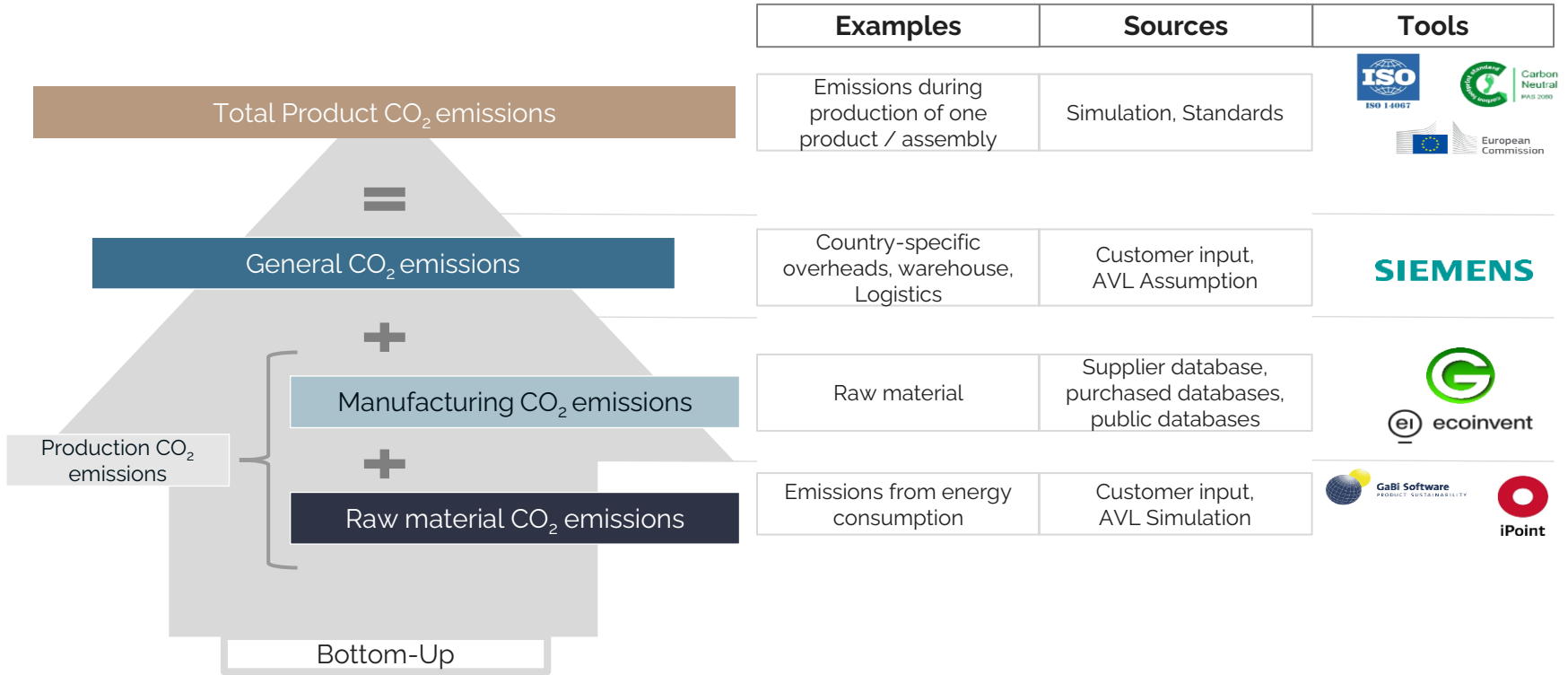
Product Carbon Footprint

Bottom-up:

- Calculation of product-specific CO₂ emissions included:
 - Raw materials
 - Pre-production within supply chain (purchased components)
 - Transport of purchased components
 - In-house production / assembly
 - Distribution of products



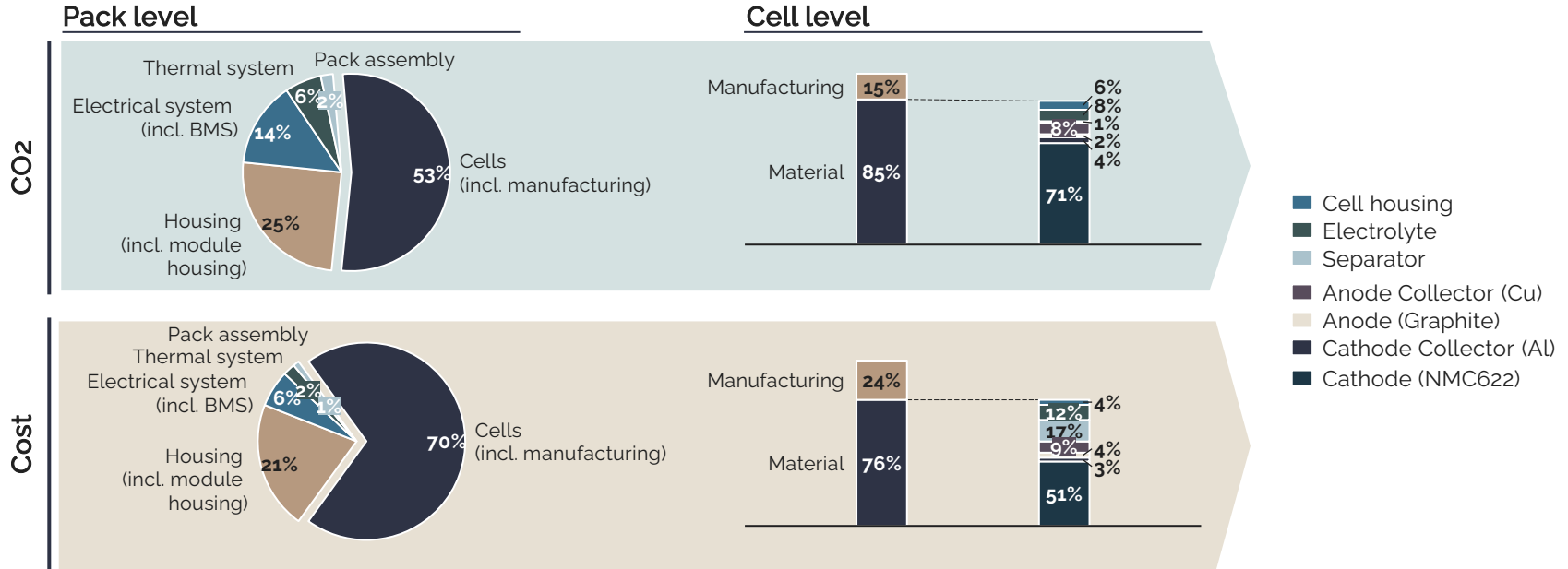
Bottom-up Approach Co₂e Footprint Analysis [KG co₂e] Within the Scope Are Raw Materials, Energy and All Related Overheads



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Every Raw Material and Every Process Step Can Be Connected Not Only To Cost but as Well to an Emission Tag

Example: CO₂ vs. Cost Distribution for a Battery Pack (NMC622)



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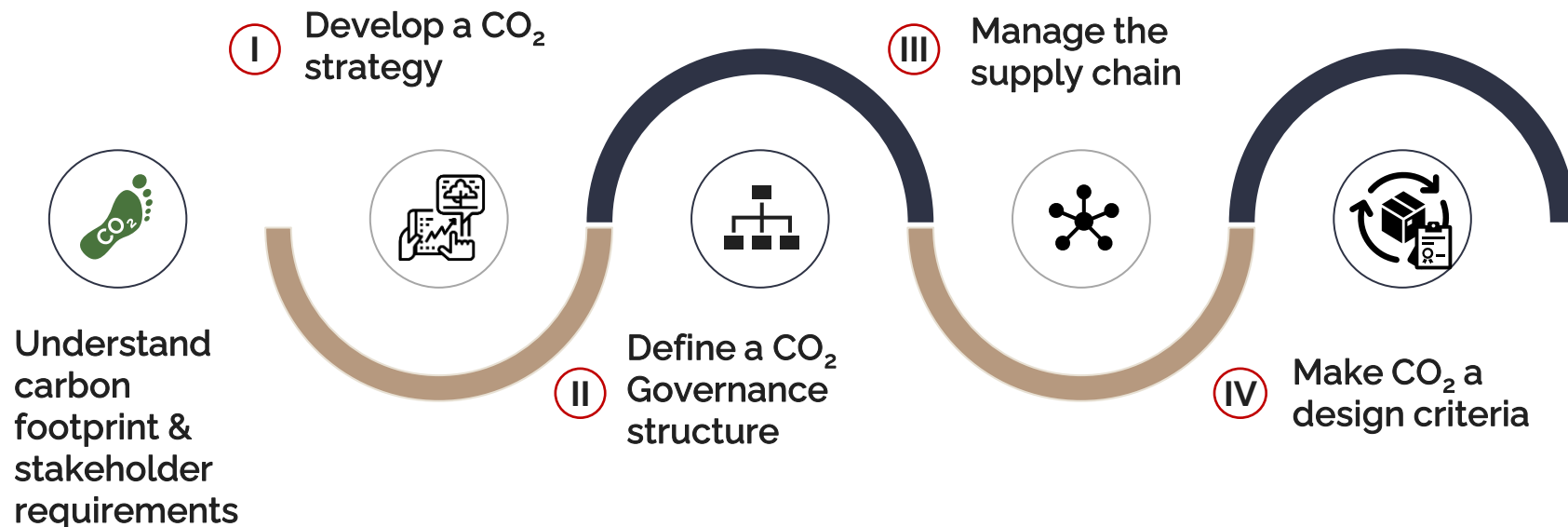
- 4 **Conclusion: What do companies have to do to cope with increasing requirements?**

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Companies Need to Consistently Master the Entire Regulatory Framework & Optimize Their Business Model, Their Supply Chain & Products in Terms of CO₂

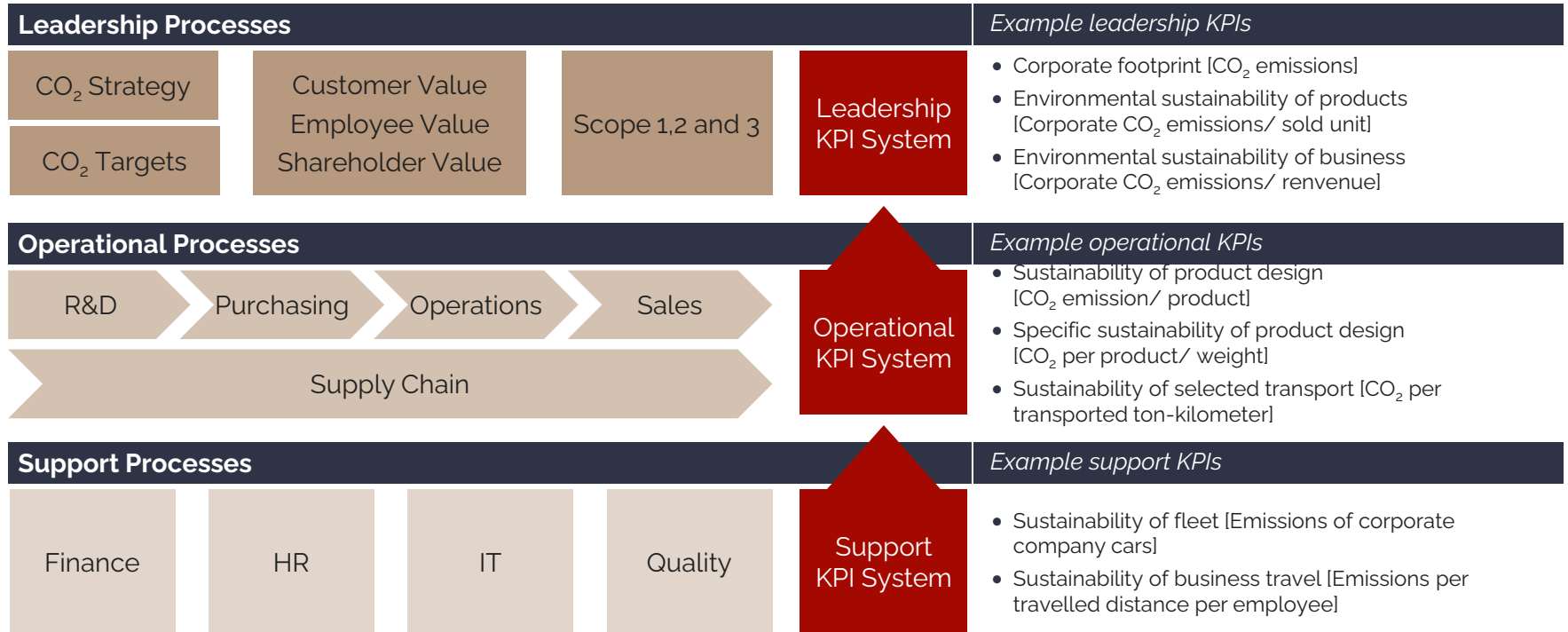
Strategic Actions to become Carbon Neutral



A CO₂ KPI System Should Include Leadership Processes, Operational Processes and Support Processes

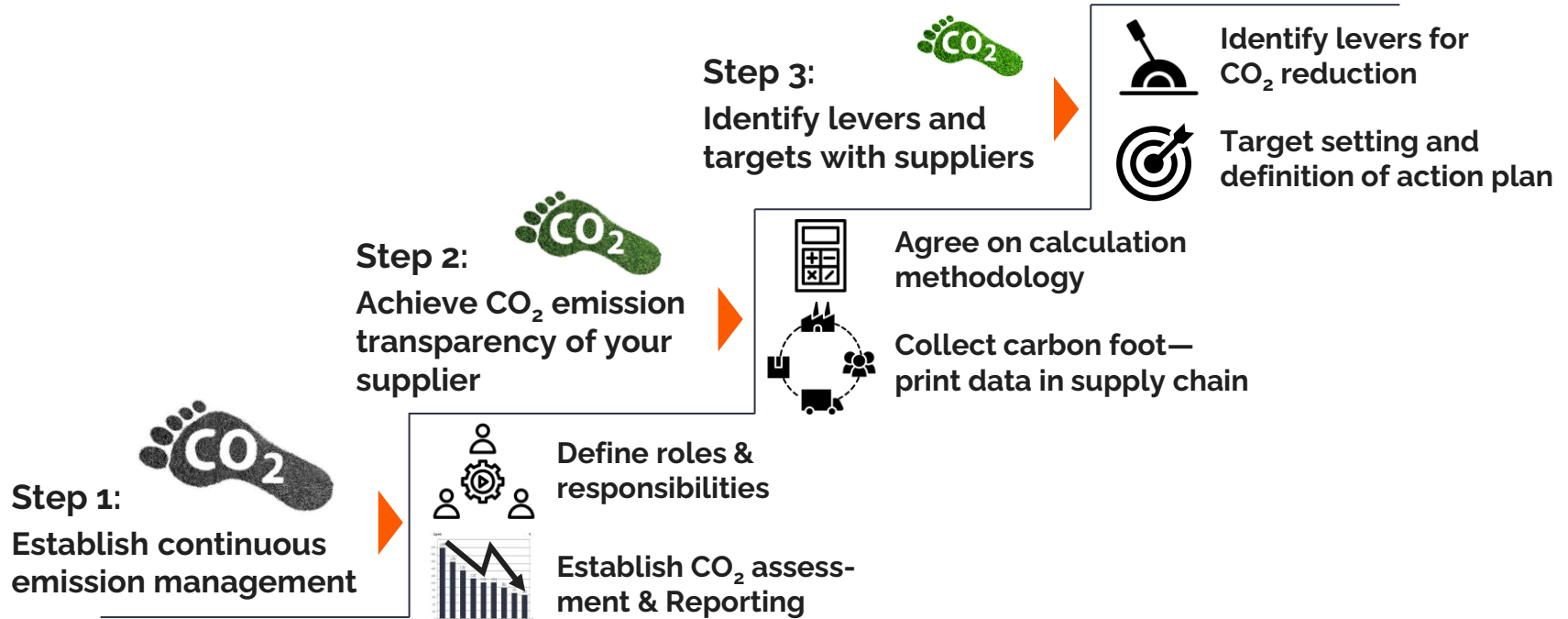
II Implement CO₂ governance structure

CLIENT EXAMPLE



To Reduce the CO₂ Footprint of the Supply Chain, Companies Needs to Start to Work Together With Their Suppliers on the Collection of the Product Carbon Footprint

III Manage your supply chain & production network: Steps towards reduction of CO₂ footprint



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