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By Hyve

Decarbonization in the Automotive Sector

Driving Towards a Sustainable Future

Dr. Wulf-Peter Schmidt
Professorship for
Technical Sustainability Management

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Decarbonization in the Automotive Sector

The Challenge

- Planetary boundaries
- Transport sectors increasing emissions

Main strategies

- Strategy and change Development
- Strategic Choices

Enabling Factors

- Pull & Push Factors: Regulation, Markets, Investors
- Life Cycle Stakeholders Cooperation

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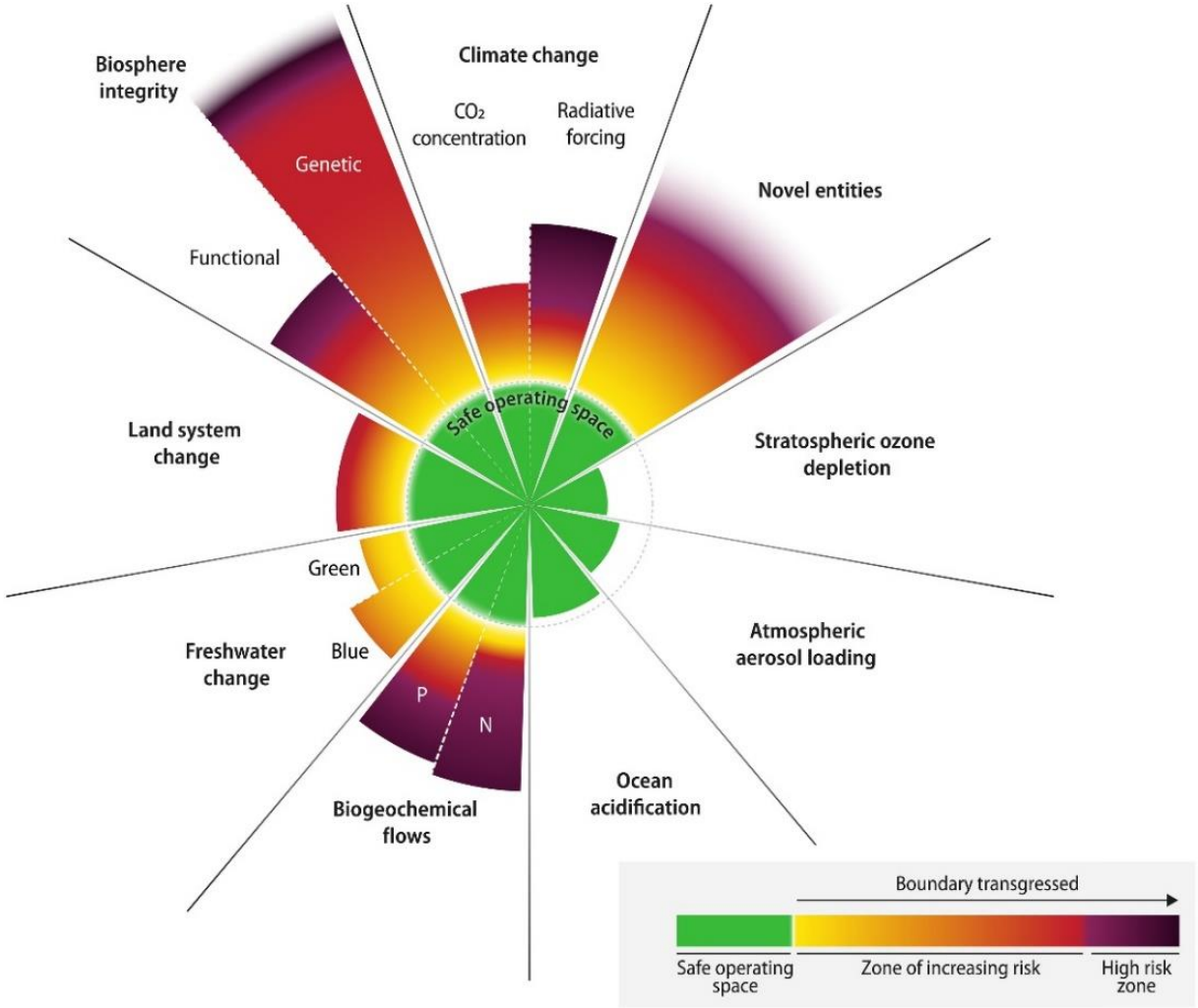
The Challenge
Planetary Boundaries - Urgency



The Challenge
Transport Sector CO2 Emission Increase

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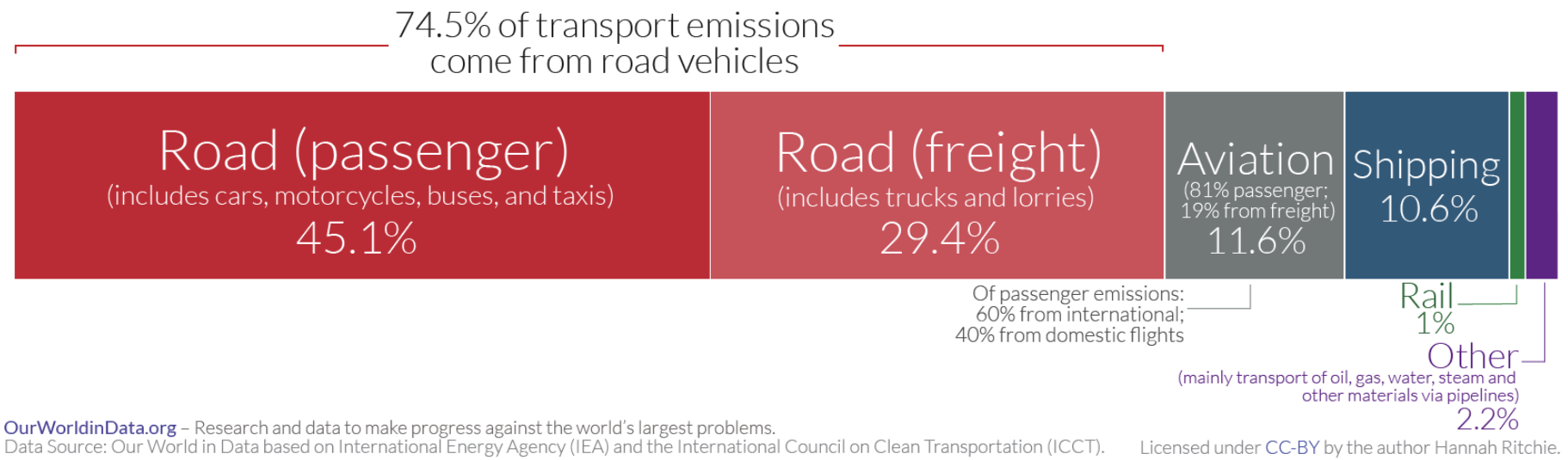
Global CO_2 emissions from transport

This is based on global transport emissions in 2018, which totalled 8 billion tonnes CO_2.
Transport accounts for 24% of CO_2 emissions from energy.

Our World in Data



OurWorldinData.org – Research and data to make progress against the world's largest problems.
Data Source: Our World in Data based on International Energy Agency (IEA) and the International Council on Clean Transportation (ICCT).

By 2070

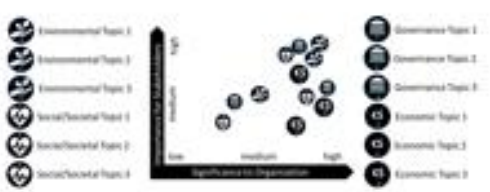
x 2
Km travelled

+ 60%
Car ownership

x 3
Aviation

Source: IEA [5]

Transformation
Strategic Analysis

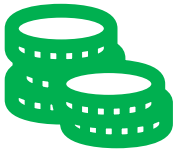
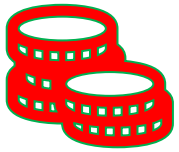
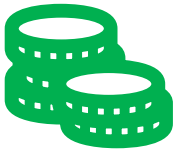


Stakeholder & Issue Scan, Materiality, Benchmarking, futuring, SWOT, Transformation design, etc.

Strategic Choices

Materials, Energy, Technology&Digitilization, Demand&Supply

Main Strategies
Strategic Choices

	Now	Near	Far
Stay with current business model			
Go with the flow			
Frontrunner “go-all-in“			

Deloitte, "Pathway to net-zero - Mastering the twofold goal of decarbonization and profitability," 2023.

Carbon Neutrality (CN) Strategies
Automotive Manufacturers

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OEM	Ford Motor Company	JLR	Stellantis	VW	Volvo
CN Date	2050 (EU: 2035)	2039	2038	2050	2040
Supplier Target CO_2	EU: Tier 1, -100% Scope 1+2 2035	-54% (2030 vs. 2020)	- 40%, (2030 vs. 2021; BEV)	- 30% (2030 vs. 2018)	2025: -25% + 100% CN Energy
Vehicle Target	EU: 2030 no ICE car; 2035 all EV	100% ZEV 2035 leading markets	ZEV 2030: EU 100%, 50% US	-50% (2030)	100% ZEV 2035 leading markets
SBTi Vehicle CO_2	-50% (2035 vs '19)	-60% (2030 vs. '20)	-	30% (2030 vs. '18)	52% (2030 vs. '19)
SBTi Facility CO_2	-76% (2035 vs '17)	-46% (2030 vs. '20)	-	50% (2030 vs. '18)	60% (2030 vs. '19)
Route Zero	x	x	-	-	X

IEA Sustainable Development Scenario
EU, US, China, Japan end all ICE 2040

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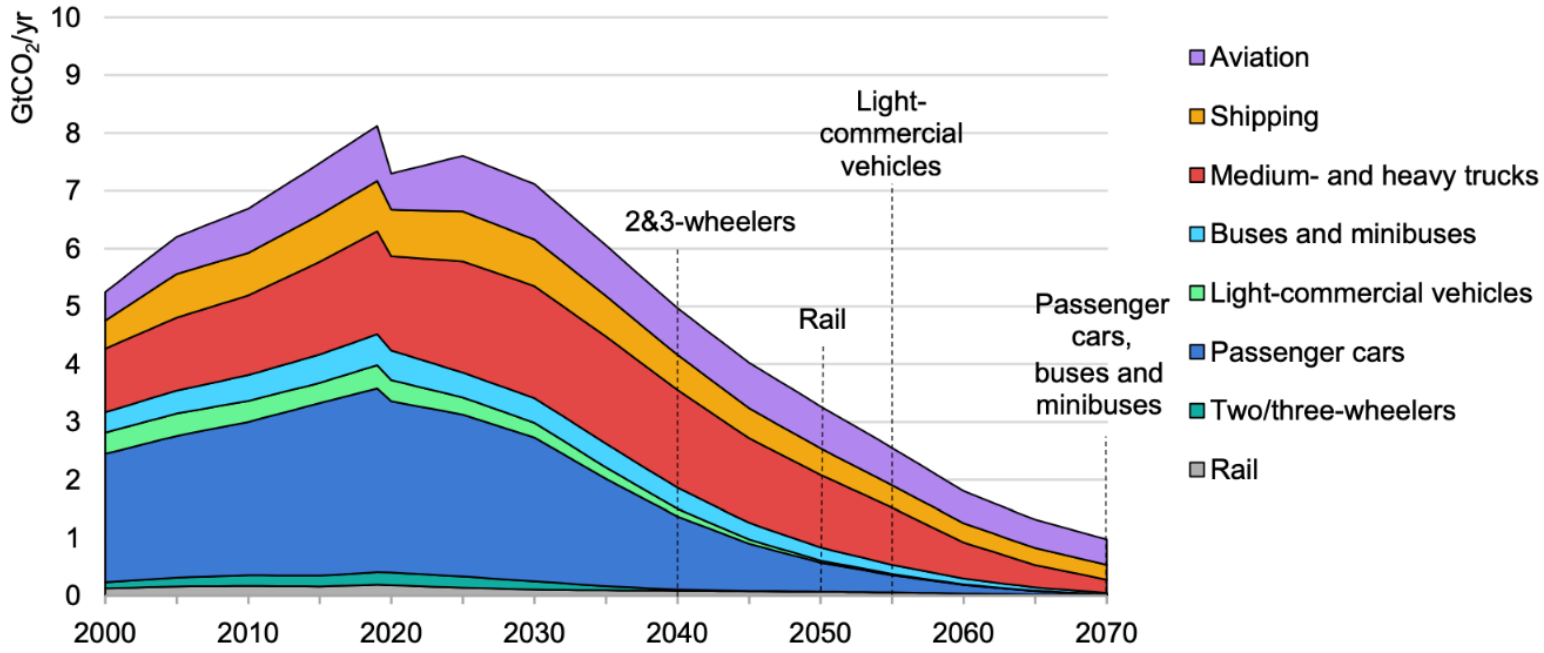
Figure 3.16 Global CO_2 emissions in transport by mode in the Sustainable Development Scenario, 2000-70



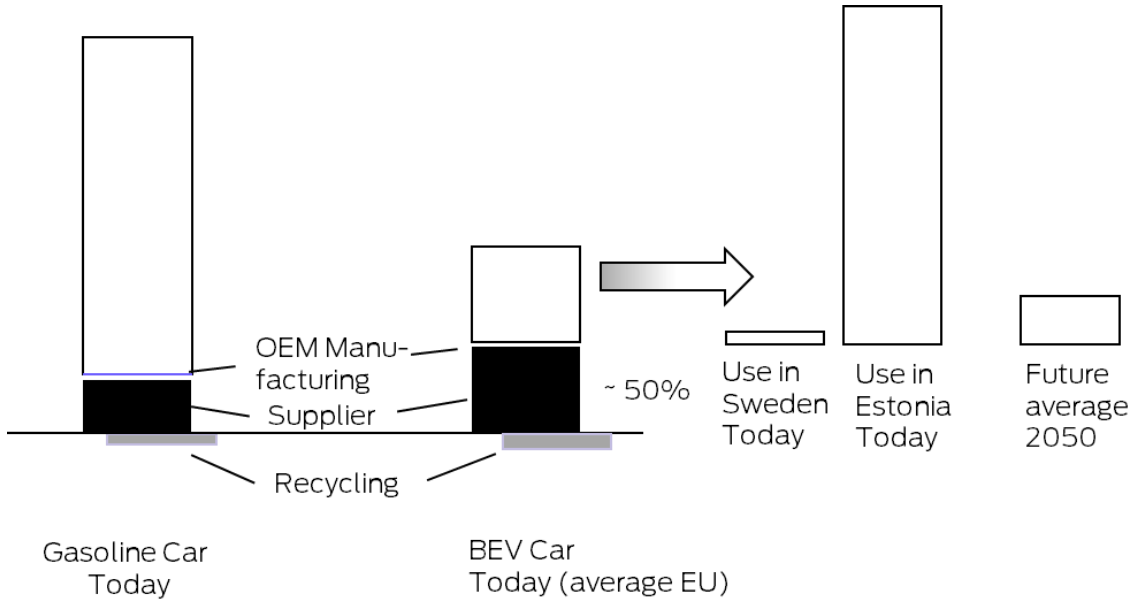
Notes: Dotted lines indicate the year in which various transport modes have largely stopped consuming fossil fuels and hence no longer contribute to direct emissions of CO_2 from fossil fuel combustion. Residual emissions in transport are compensated by negative emissions technologies, such as BECCS and DAC, in the power and other energy transformation sectors.

Transformation options
Example – Transportation

- Opportunities exist for all modes
- Most difficult for Airfreight & ships

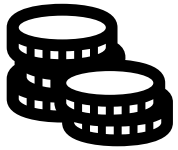
	Transformation Opportunity
Avoidance	Digitalization, 3D printing
Cargo bike	Electrification, inclusion in local logistic hubs
Pipelines	Underground pipelines with electric-powered freight capsules
Ships	Electrified ocean with battery swapping or fast hydrogen-powered hydro foiling
Railways	Renewable electricity, separate good & people infrastructure
Vehicles	Full electrification with renewable electricity
Airfreight	Low carbon fuel

- Life Cycle comparison – passenger cars
- Electricity infrastructure and source are key



Enabling Factors
Push & Pull Factors

Pushing away from old Economy



Cost increase
(e.g. ETS, CBAM, energy & material pricing.
Car tax: NL, France. Norway several 10k€ tax)

Restrictions & bans
(e.g. 2035 -100% CO_2, 7 National ICE bans 2030
& Bans in most major EU cities besides East)

Media & NGO
(e.g. Court cases, campaigns)

Pullling towards Sustainability

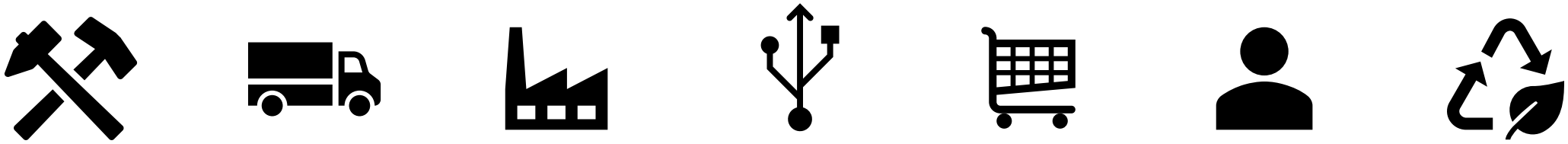
Financial support & demand
(e.g. Sustainable investors, state aid,
taxonomy & sustainable finance reg.
limited EV incentives in few countries)

Customer demand drivers
(e.g. Green public procurement,
sustainable tenders, taxonomy,
corporate fleet ZEV mandate)

Technology
(e.g. price advantages such as low
running costs)

Enabling Factors
Push & Pull Factors – Life Cycle Stakeholder

Materials, Energy, Information&Digitilization, Infrastructure, Demand&Supply



Conclusion

Challenge

- Urgency to act now
- Transport sector emissions continue to increase
- Thorough strategic analysis needed
- OEMs are moving in the direction of carbon neutrality – at different pace

Transformation

- Need to be “All-in“ and have financing
- Electrification and/or change to green hydrogen
- Source of energy and infrastructure are key
- Pull & Push factors are in place
- Life Cycle perspective key

- Research and Lectures for Technical Sustainability Management will help all sectors in their transformation journey

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