



DRIVING DIGITALIZATION

FACT BOOK



KNORR-BREMSE

Agenda

- **Introduction**
- Key Company Highlights
- Rail Vehicle Systems (RVS)
- Commercial Vehicle Systems (CVS)
- R&D Focus
- Financials
- Sustainability
- KB shares/ KB bonds
- Appendix



The Knorr-Bremse leadership team



Marc Llistosella,
Member of the Board, CEO

- 2023-present: Knorr-Bremse | CEO
- 2021-present: Vaionic Technologies GmbH | Board Member and investor
- 2019-present: Einride AB | Board Member and investor
- 2008-2018: Daimler Trucks Asia | 2015-2018: President & CEO, Mitsubishi Fuso Truck & Bus Corporation; Head of Daimler Trucks Asia | 2008-2014: Managing Director & CEO, Daimler India Commercial Vehicles
- Diploma in Bus. Administration

with Knorr-Bremse since **01/23**



Frank Weber
Member of the Board, CFO

- 2020-present: Knorr-Bremse | CFO
- 2016-2020: Daimler AG | Head of Corporate Development
- 2019-2020: Mercedes-Benz AG | Head of Transformation
- 2013-2016: Daimler Trucks Asia | CFO
- 2011-2013 Mitsubishi Fuso Trucks & Bus Corporation | CFO
- Diploma in Bus. Administration

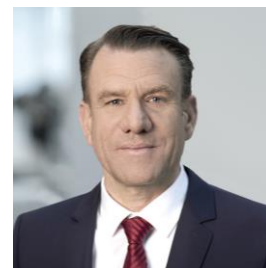
Years with Knorr-Bremse **2**



Dr. Claudia Mayfeld
Member of the Board,
Integrity & Legal

- 2021-present: Knorr-Bremse | Head of Integrity & Legal
- 2013-2019: RWE Pensionsfond | Member of the Executive Board
- 2016-2020: Innogy SE | Senior Vice President Group Legal & Compliance, General Counsel
- 2013-2016: RWE AG | Senior Vice President Group Legal & Compliance, General Counsel
- PhD in Accounting Principles

Years with Knorr-Bremse **1**



Bernd Spies
Member of the Board, CVS

- 2022-present: Knorr-Bremse | Head of CVS
- 2014-2022: Knorr-Bremse | Member (2013-2015) and Chairman (since 2014) of the Management Board, CVS
- 2008-2013: Hella KGaA Hueck & Co | Member of the Management Board, Global Sales
- 2006-2008: Robert Bosch GmbH | Head of Commercial Vehicles product division, Starters and Alternators
- Diploma in Electrical Engineering

Years with Knorr-Bremse **8**



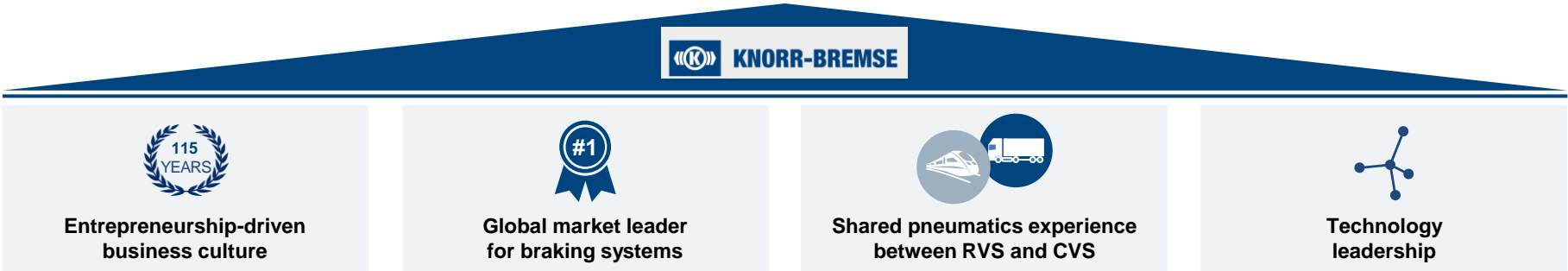
Dr. Nicolas Lange
Member of the Board, RVS

- 2023-present: Knorr-Bremse | Head of RVS
- 2017-2023: Knorr-Bremse | Member (2017-2019) and Chairman (since 2019) of the Management Board, RVS
- 2009-2017: Senior Vice President CoC Bogie Equipment
- 2006-2009: Head of Development and Testing Brake Mechanics
- 2000-2006: Team Lead Technology and Development Brake Mechanics
- Doctorate in the field of Transmission Technology

Years with Knorr-Bremse **23**



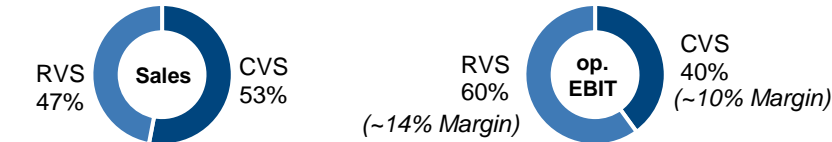
Knorr-Bremse – One of Germany’s most successful industrial companies



2023 Key financials



BALANCED PORTFOLIO²⁾ ...

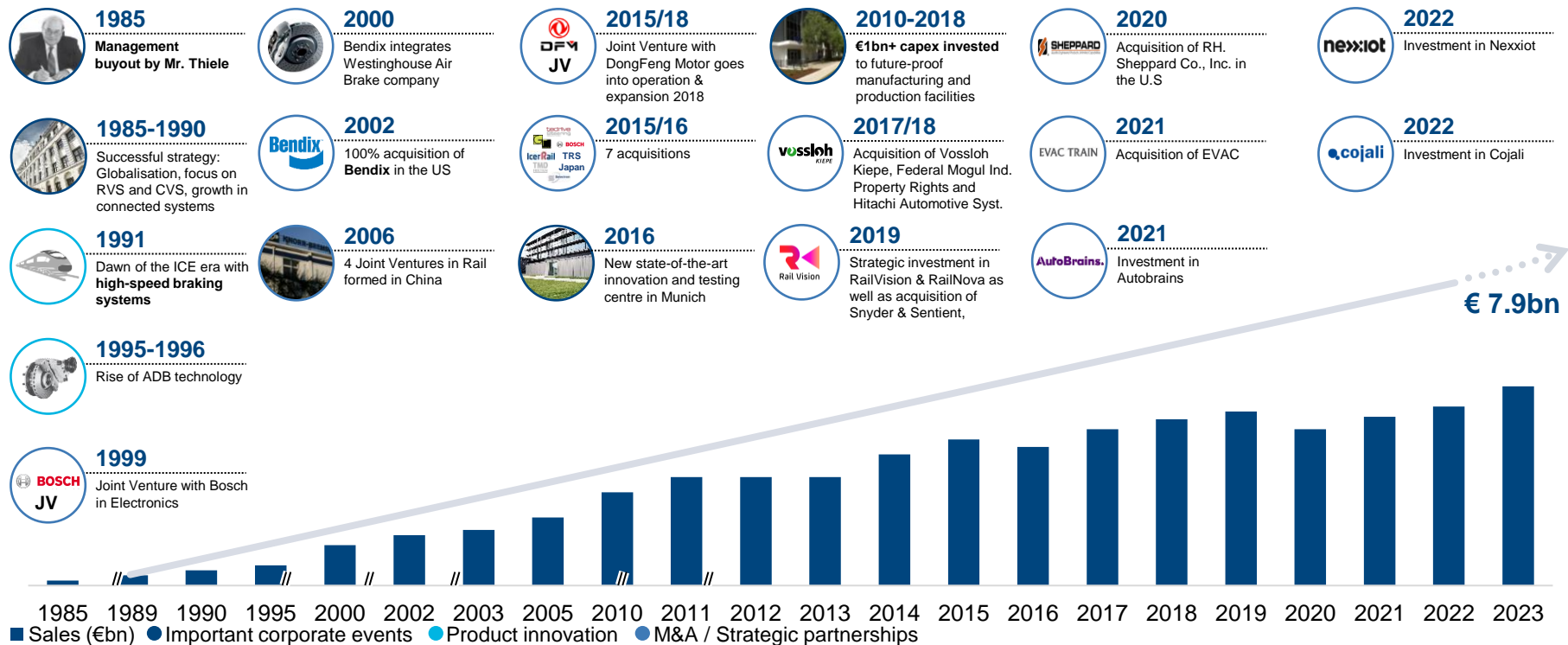


... AND DIVERSIFIED GLOBAL FOOTPRINT WITH HIGH LOCAL CONTENT



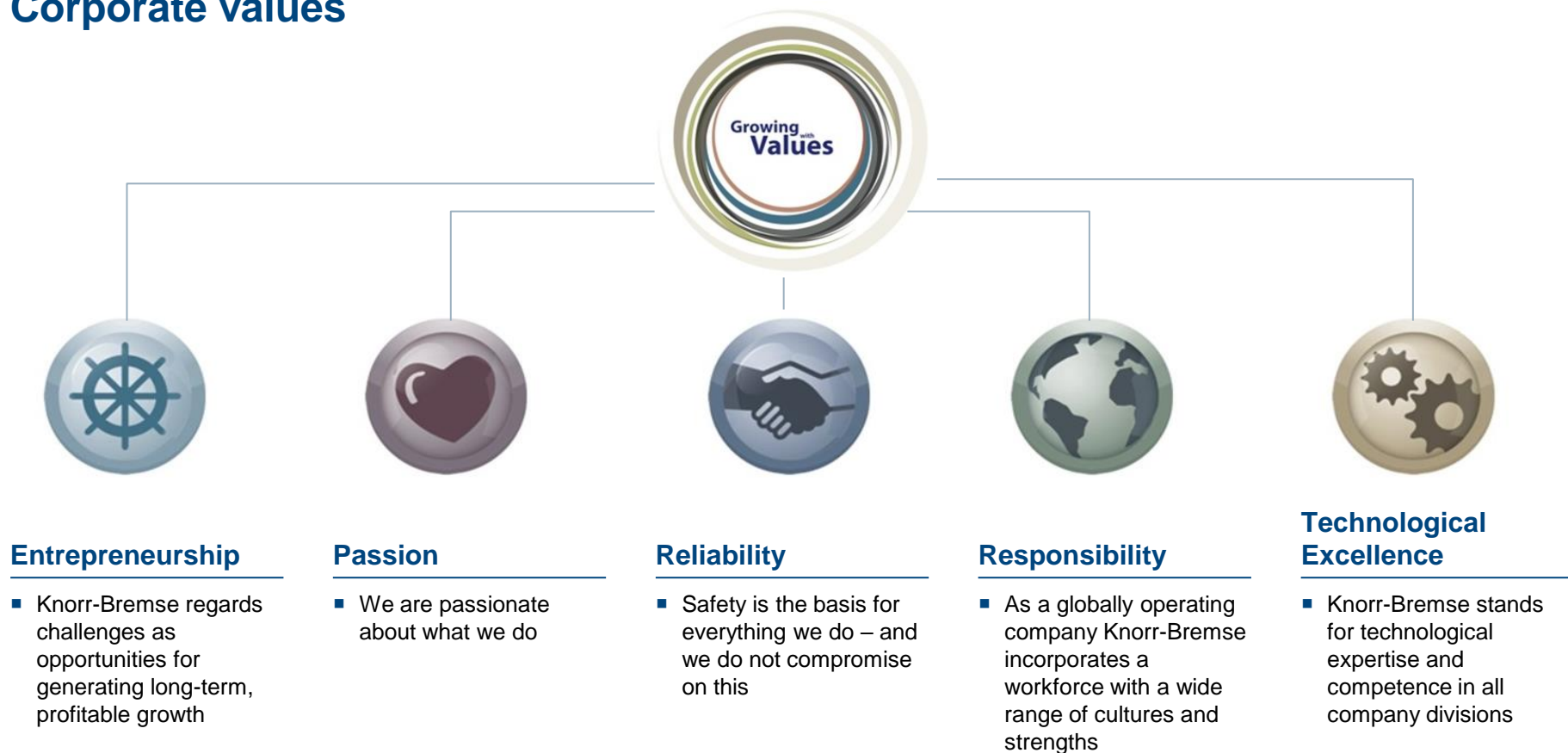
Notes: Sales, EBITDA, EBITA, and EBIT for 2020 based on annual report prepared in accordance with IFRS, other financial figures for 2020 prepared in accordance with German GAAP (HGB); Aftermarket share based on German GAAP (HGB) where BilRUG sales allocated proportionally between OE and aftermarket; RVS – Rail Vehicle Systems; CVS – Commercial Vehicle Systems; 1) CAGR 1989–2019 based on German GAAP (HGB), 1989 – first year when consolidated accounts are available; 2) Excluding consolidation/other; 3) Including human resources leased staff; Source: Knorr-Bremse information

Over 30 years of consistent strong growth



Notes: 1986-2016 based on financial statements prepared in accordance with German GAAP (HGB) and 2017-2019 based on financial statements prepared in accordance with IFRS. 1) 1989 – first year when consolidated accounts are available

Corporate values



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Global market leader in rail and truck



Market leadership

A global market leader

~50% market share¹ in RVS brakes

~23% market share¹ in CVS brakes



Market outperformance

Track record of **above industry growth**



Innovation edge

Shaping industry trends by focusing on **safety** and **mission critical** applications



Sustainability

Our technologies are the **foundation for sustainable and safe transportation**



High safety requirements

Key supplier with global core technology know-how and capabilities
Clearly ahead in global **homologation** processes



Resilience

40% aftermarket share¹

Well-balanced **portfolio**
Cost-efficient operations



Profitability

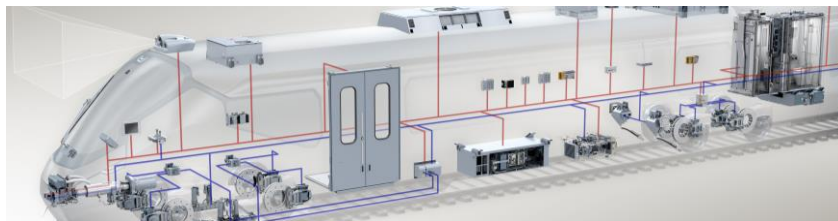
Focus on **attractive** rail and truck **end markets**

1) In 2023

Global #1 – Leading supplier of safety-critical rail and commercial vehicle systems

RVS offering (2023: 47% of sales, 60% of EBIT)

Brake systems	Entrance systems	HVAC ¹⁾	Train Control Management Systems	LRV ²⁾ traction systems
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Power electronics	Sanitary systems	Signaling systems
Modernisation and support		Aftermarket business

CVS offering (2023: 53% of sales, 40% of EBIT)

Fuel efficiency <ul style="list-style-type: none"> Engine components Transmission 	Brake systems, steering & vehicle dynamics <ul style="list-style-type: none"> Brake control Brake systems Automated driving Steering systems
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Energy supply & distribution	Connectivity	Electrification
Aftermarket services including Alltrucks network ³⁾ ALLTRUCKS		

Our customers

Example car builders



Example operators



Notes: 2020 financials based on IFRS excluding consolidation/other; 1)HVAC – Heating, ventilation and air conditioning; 2)LRV – Light rail vehicle; 3) Joint Venture between Bosch, Knorr-Bremse and ZF providing a range of workshop services relating to the repair and maintenance of commercial vehicles across all brands; 4) OEM – Original Equipment Manufacturer

Global #1 – ... protected by high barriers to entry

Barriers to entry for RVS and CVS markets

Regulation / homologation

Low volumes, high number of variants with high level of customisation

High initial capital requirements, highly protected IP landscape and economies of scale

Highest quality and safety requirements

Long life-cycle with resulting customer loyalty, long gestation period for aftermarket

Same industry leaders since creation of the industry over 100 years ago

Market specifics

RVS

Only supplier world-wide

certified for all global and local standards and norms (GOST, UIC, AAR, ARA)

Vast array of product variants to homologate

(e.g. >100k active brake articles by Knorr-Bremse)

Homologation time typically 4-8 years

for recent Knorr-Bremse products

CVS

One of only two suppliers able to offer harmonised products globally

Continuously increasing safety and emission standards requirements

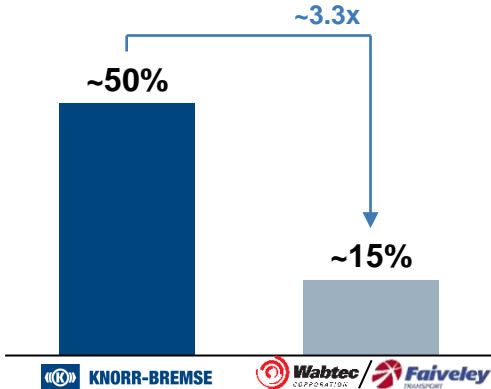
KB has maintained and expanded its market leading positions



Market positions key product groups¹

Global brakes market shares¹

- #1 Brake systems
- #1 Entrance systems
- #1 HVAC systems²



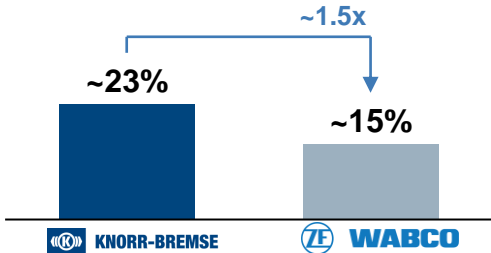
Example global market leader
for brakes¹



Market positions key product groups³

Global brakes market shares³

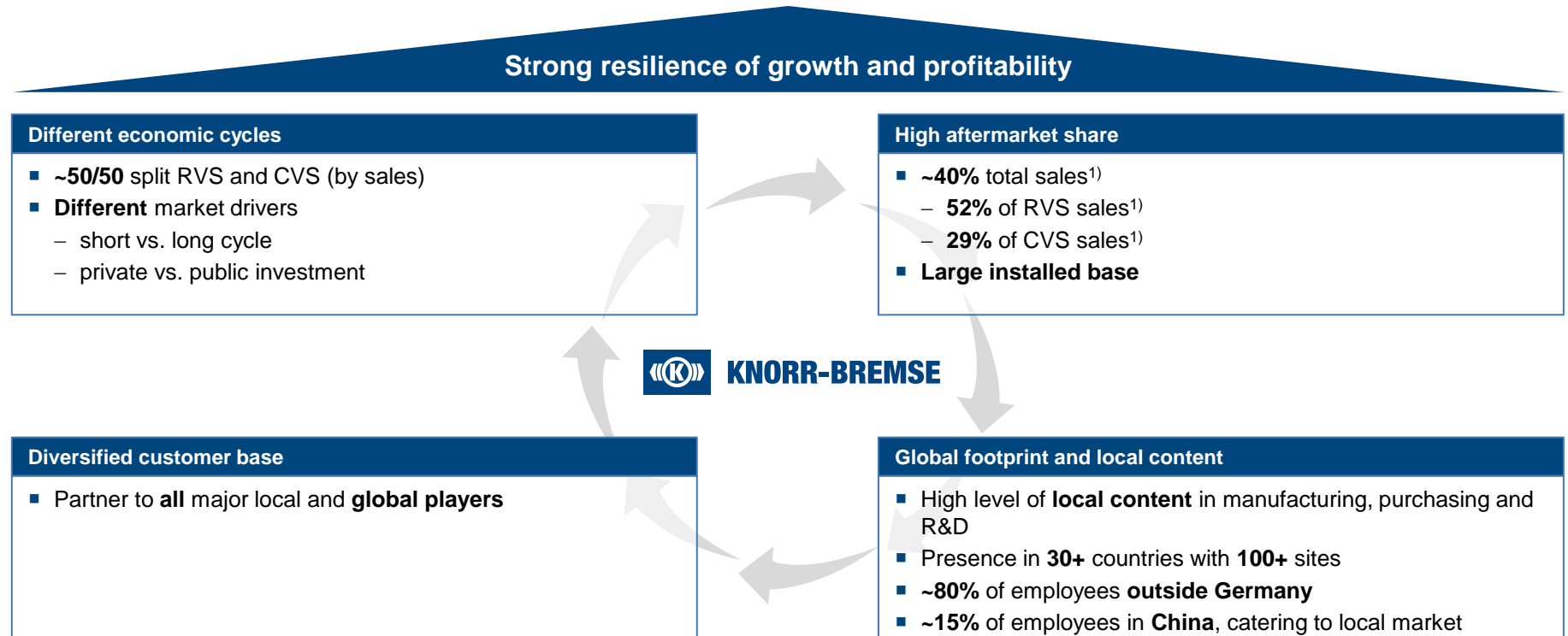
- #1 Brake systems & vehicle dynamics⁴
- #1 Energy supply & distribution⁵
- #1 Fuel efficiency⁶



Example global market leader for
brake systems & vehicle dynamics⁴

1) 2020 estimates for OE and aftersales without labor; Wabtec includes Faiveley; For competitor, an estimate was used; Market shares rounded to the nearest multiple of 5% 2) Heating Ventilation Air Conditioning
3) For 2020 global addressable Truck, Bus and Trailer OE market, excl. aftermarket 4) Air disc brake, valves / pedal unit, actuators, foundation drum brake, steering, brake control (ABS, EBS, ESP), ADAS, ELC, others 5) Compressors, air treatment 6) Vibration dampers, engine air control, transmission – gear and clutch actuation/ control; Source: internal market research

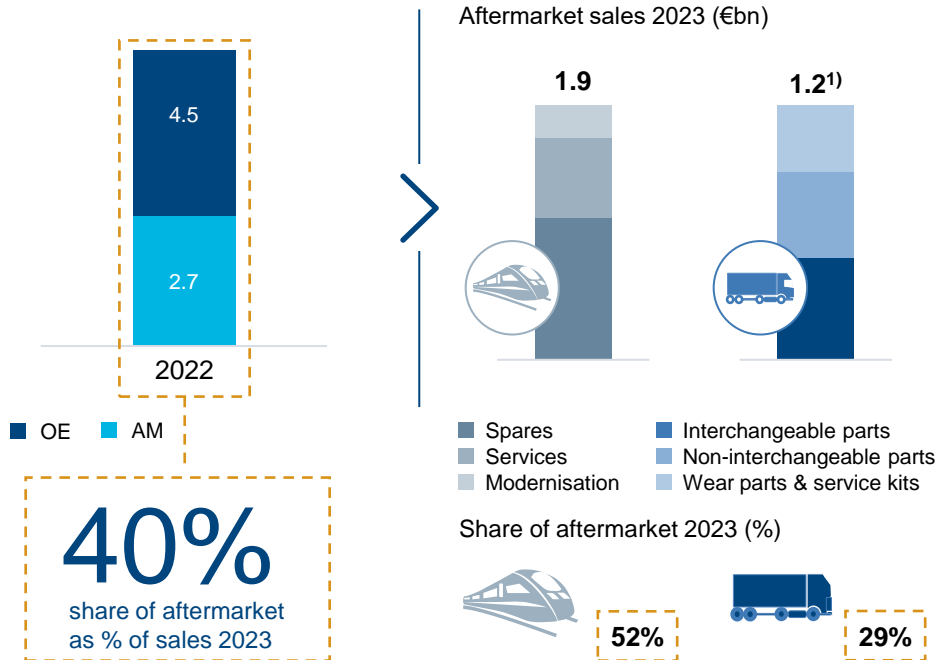
Resilience – Strong business model



Notes: 1) Based on IFRS in 2023

Resilience – Attractive aftermarket business with comprehensive service offering drives profitability and contains high future potential

Aftermarket is the growth and resilience backbone



Key features

Annuity-like

- Regulated maintenance intervals
- Leverages high installed base
- 20-30 years long relationships



Close to the customer

- RVS
 - 36 service centres²⁾
 - 20 service locations at customers' premises
- CVS
 - >1,600 certified service partners
 - >700 Alltrucks workshops



Strong customer retention (homologation)

- High switching costs
- Focus on safety and quality
- IP protection



Innovative business model

- New connectivity-based business models
- Preventive
- Predictive



Notes: 1) Total CVS aftermarket sales and independent aftermarket sales EMEA (excl. South Africa & Skach) as proxy for the global split; 2) Does not include service locations at customers' premises

Synergistic business – Technology and scale benefits between Rail and Commercial Vehicles

Interdependence of RVS and CVS

- Same core technologies
- Shared components and materials
- Co-located R&D centers
- Shared overhead functions

Future technology development

- Shared research centres
- ADAS¹⁾ / HAD²⁾ technology transfer
- Condition monitoring, condition-based and predictive maintenance
- Electrification and connectivity
- Electromechanical brake systems

Differences of RVS and CVS

- Serial business (CVS) vs. project business (RVS)
- Different customer group

RVS



CVS



Electric compressors
Friction materials
Air disc brakes (ADB)

Driver assistance
Trailer control valve
Electronic air supply

Notes: 1) ADAS – Advanced driver assistance system; 2) HAD – Highly automated driving

Innovation is the basis of KB's technology leadership and long-term success



True Scale:

>4,000 R&D employees
Thereof 740 software engineers
5 global R&D centers (3 co-located)



Agile R&D methods implemented



Extensive partnership network & collaboration with tech players



In-house incubator



Pioneering innovations (examples)

RVS



Digital automatic coupler for freight (DAC)



Reproducible braking distance



LIFEDrive sliding doors

CVS



Electric power steering



Electronic parking brake



eCompressor

Long-term R&D ratio: 6 – 7 %

We confirm our successful strategy

- «1» Systematically **develop base portfolio**
- «2» **Focus on attractive segments** for future outperformance in **rail** and **truck**
- «3» Drive **innovation & digitalization**
- «4» **Clear M&A strategy**
- «5» **Operational excellence**
- «6» **ESG and sustainability**
- «7» **Strong financial performance**



Knorr-Bremse is ideally positioned to shape the trends of the future



Urbanization



Sustainability



Digitalization



Mobility

Industry trends: addressing industry trends with superior technological solutions

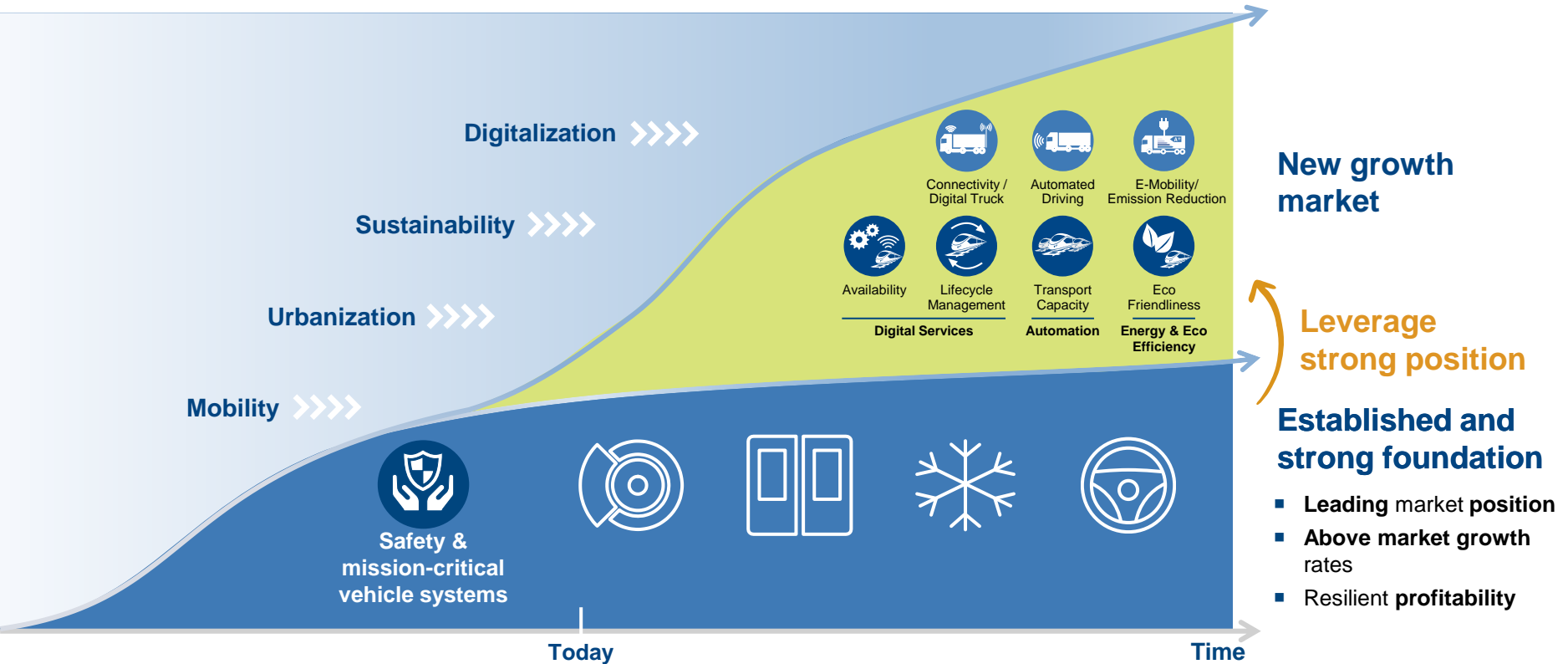


Transport Capacity
Availability
Eco Friendliness
Life Cycle Management



Traffic Safety
Emission Reduction & E-Mobility
Automated Driving
Connectivity

Knorr-Bremse will continue to grow its core business further and will also develop new levers of growth



Knorr-Bremse continues to systematically develop its portfolio of mission critical products and digital solutions

Mechanical products

Mechatronic products

Smart & digital products

— **Strong basis** —



Pneumatic
brake
system



Air disc
brake



Electronically
controlled
pneumatic
brake



ABS & EBS



Smart brake
control (Cube
Control)



GSBC &
rGSBC

Digitalization empowers KB's growth engine



Majority investment



Capabilities

- ✓ All-Makes workshop diagnostics
- ✓ Telematics incl. remote vehicle diagnostics
- ✓ Data analytics & big data

Applications

Aftermarket ecosystem



Predictive maintenance



Data monetization



Impact



Strong growth & profitability



~ 15% revenue CAGR until 2026



Strategic partnership & minority investment



nexxiot

- ✓ Specialist in IoT-technologies
- ✓ Diagnostics & telematics
- ✓ Cloud-based ecosystem

Multiple transport segments¹



Condition monitoring



Predictive maintenance



€ 50-70m new dig. KB rev. in 2026²



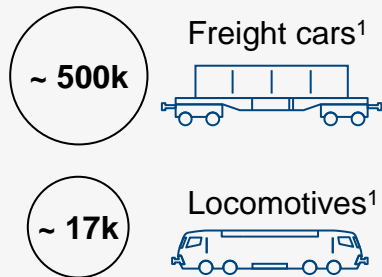
~ 1.5m installations until 2024³

1. Segments include rail freight, maritime freight and rail non-freight & DAC 2. Digitally-enabled revenue by Nexxiot 3. In connected wagons & intermodal containers

RVS in strong position to tap into digital automatic couplers



Digital Automatic Couplers | Enabling faster processing and enhanced safety



Vast untapped future market in 2030+

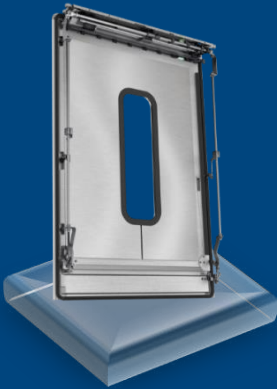
RVS at the forefront of innovation



1. Current numbers for EU market only, representing potential future market in Europe

Condition monitoring to become a major source of digital offering

Key performance of door systems defined by:



Availability
All doors in service



Reliability
Highest MTBF¹



Passenger safety
Safety functions fully operational

RVS helps customers to efficiently monitor and measure KPIs:



Condition monitoring @ IFE

> 5,000

Doors connected
in 245 trains

~ € 33m

RS contract value²

> 15,000

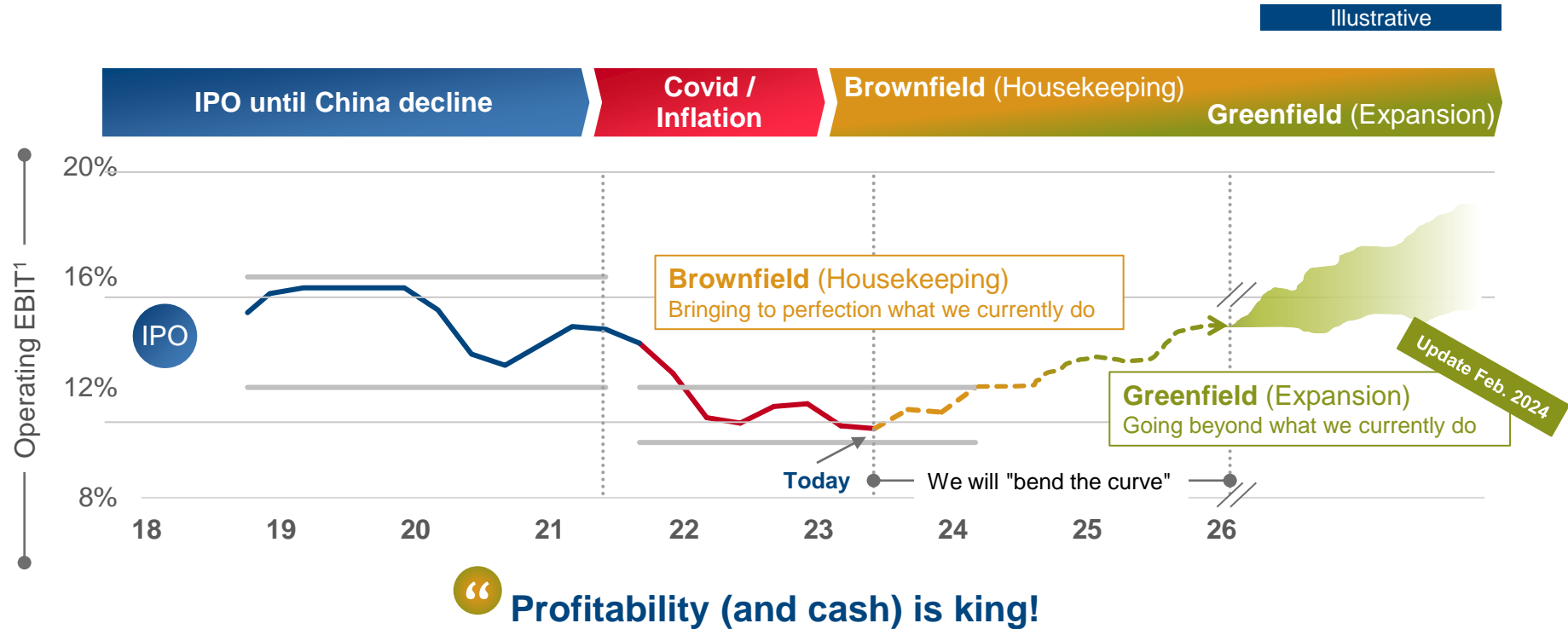
Future potential
for connected doors



... Predictive maintenance to come next

1. MTBF: Mean Time Between Failures 2. Monitoring offered as part of long-term supply agreements (LTSA) only; includes active and ordered volume














We will "bend the curve" to bring KB to the next level






1. Indicative reported EBIT; Note: All figures after today are illustrative only

BOOST¹ program with clear responsibilities to reach the next level

BOOST 2026

Strategic initiatives	 Products	 People	 Processes
 Brownfield (Housekeeping)	2 Revitalizing the core 	1 Culture development 	3 Efficiency programs (PCPP) 
	4 Portfolio right-sizing 	Organizational transformation	
	4 Fix-it program 	Talent mgmt. (HR Connect) 	NWC optim. (Project Collect)
	5 Renewal of innovation power		SG&A, legal entity reduction 
	Expansion of aftermarket		IT excellence (S4Hana) 
 Greenfield (Expansion)	6 Driving digitalization (growth)	Strong EVP ²	Driving digitalization (efficien.)
	7 Enabling ESG for our customers (incl. CO ₂ emission reduction)		
	8 Selective M&A		

1. Knorr-Bremse Operational Optimization Strategy and Transformation 2. Employer value proposition  Initiative started   Deep dives in the following

Clear vision for 2026: Become strong capital goods company by successfully managing portfolio of robust assets

Strong capital goods company



Culture development – team, commitment, responsibility & execution



Operational excellence in everything we do → **BOOST**

Targets 2026: Ambitious financial targets to drive value creation

Strong capital goods company



**€ 8-9bn
revenues**



**80-90%
cash
conversion**



**> 14%
Op. EBIT margin**

Growth

Revenue **€ 8-9bn**

Profitability

Op. EBIT margin **> 14%**

CVS > 13.5%

RVS > 16.5%

ROCE **> 20%**

Free Cash Flow

CCR **80-90%
sustainably**

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RVS: outperformance and resilience



Market leadership

Global #1 market leader across products and regions (e.g. ~50% market share in brake systems)



Strong growth profile

RVS with **long track record of outperforming underlying markets**



Technology innovation

- **Strong technology innovator** shaping industry standards
- Continuation of **R&D investments**



High barriers to entry

- **Safety-critical products** with significant homologation barriers
- RVS only supplier certified for all standards and norms globally



Resilience

- **Expansion of business** through customer-region-product mix
- **Strong aftermarket** (~48% revenue share)





Profitability

Outstanding profit margins with track record of margin expansion and disciplined cost management

RVS: the leading safety critical systems supplier for rail with a track record of market outperformance





Highlights

-  Rail brake systems supplier globally¹⁾
-  Rail entrance systems supplier globally¹⁾
-  HVAC systems supplier globally¹⁾
-  Global brakes market share¹⁾
-  Present in 50-55% of global installed base²⁾
-  c.16k employees

2023 key financials

- € 3.7bn sales
- € 536m op. EBIT (14.3% margin)
- 52% aftermarket share⁴⁾

2023 sales split

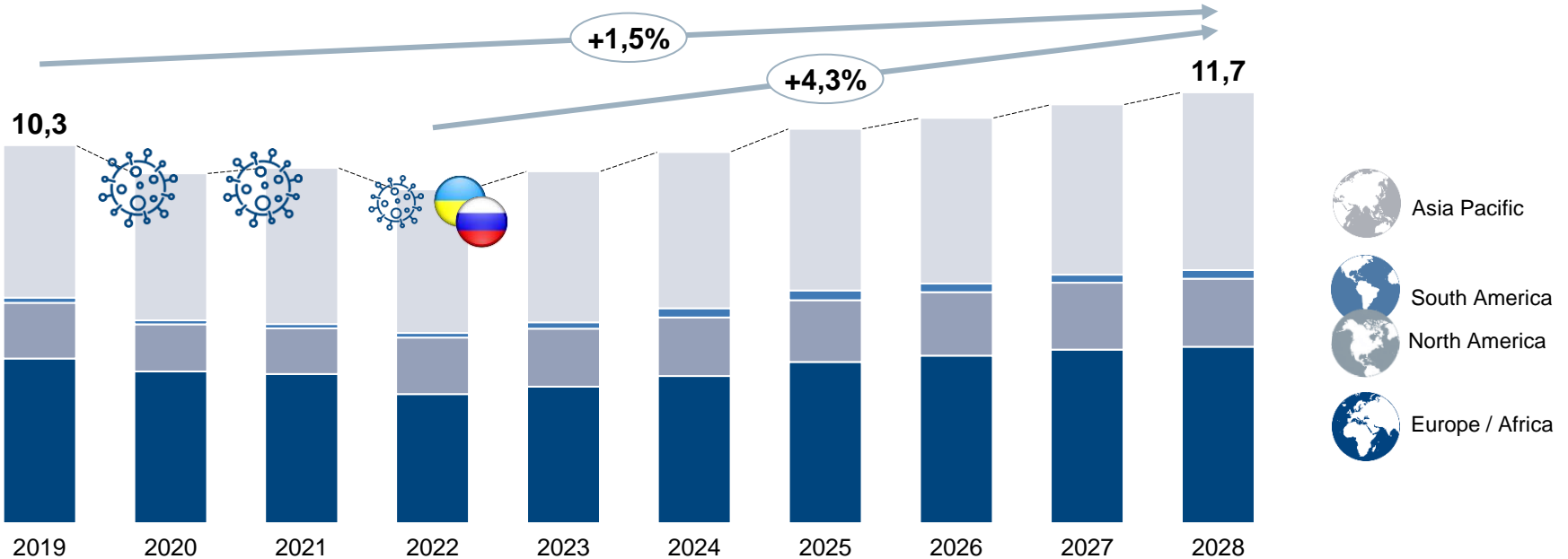
- by region
- 
- | Region | Share |
|------------------|-------|
| Europe | 56% |
| Asia / Australia | 32% |
| Americas | 12% |
- by channel
- 
- | Channel | Share |
|---------|-------|
| AM | 52% |
| OE | 48% |

Notes: BilRUG sales allocated proportionally between OE and aftermarket; 1) RVS market share estimates for OE and aftersales without labour; 2) All active rail vehicles without freight cars with a minimum of one Knorr-Bremse system related to brakes, entrance systems and HVAC installed; 3) Total reported RVS sales growth including OE and aftermarket based on German GAAP (HGB) 2010-2016; from 2016 IFRS 4) BilRUG sales allocated proportionally between OE and aftermarket

Long-term growth in global rail will continue, despite Covid aftermath and Russian invasion into Ukraine



Development of relevant sub-systems market volume¹ (OE + AM in €bn)



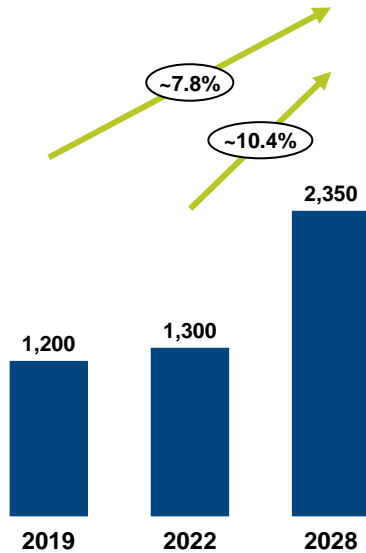
1) Big Five - Brakes, Doors, HVAC, Power Electronics, TCMS; Source: Knorr-Bremse information and internal market research

Future growth will come from markets in Europe, Asia and Americas



Market development OE in €m, CAGR in %¹

Selected biggest growth markets



	CAGR '22-'28	Market position ³
North America & Mexico MT	~10%	#2
South America	~21%	#1
Austria	~13%	#1
France	~11%	#2
Germany	~7%	#1
Scandinavia	~18%	#1
Spain & Portugal	~10%	#1
India (High Grade)	~8%	#1
South East Asia	~24%	#1
South Korea	~9%	#2
Selected biggest growth markets	~10%	#1
RoW ²	~2%	#1

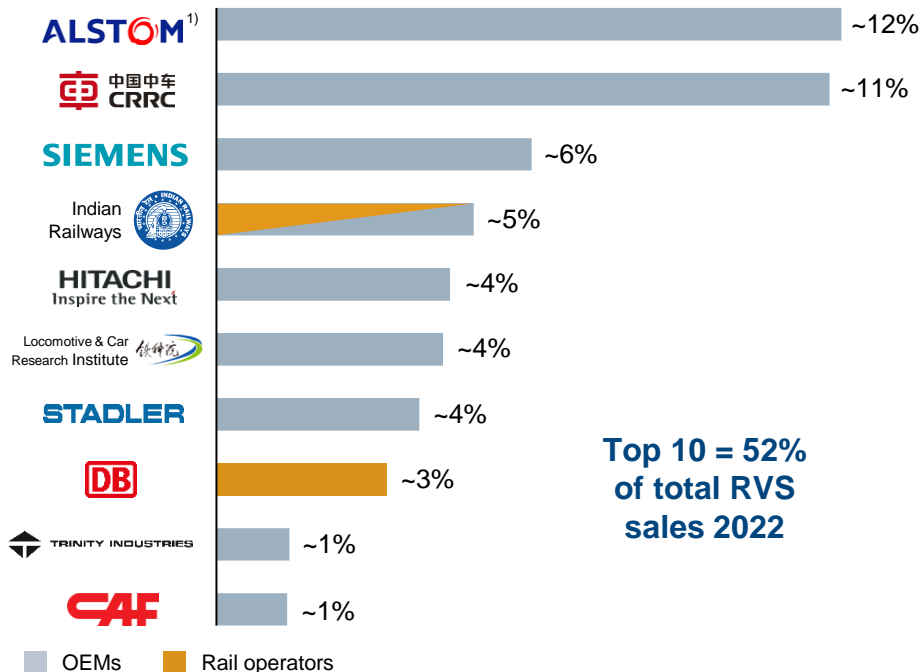
1) Brakes, Doors, HVAC, rounded to the nearest 50 2) Rest of World w/o selected biggest growth markets & w/o Russia & CIS 3) Year 2022

Source: Knorr-Bremse internal market research; Values recognize FX rates

Global Tier-1 partner of choice for OEMs and rail operators in all regions



Top 10 customers 2022 (% of sales)



**Top 10 = 52%
of total RVS
sales 2022**

Other major Knorr-Bremse customers

>300 relevant rail operator customers

Europe / Africa



Americas



Asia / Australia



>50 relevant OEM customers

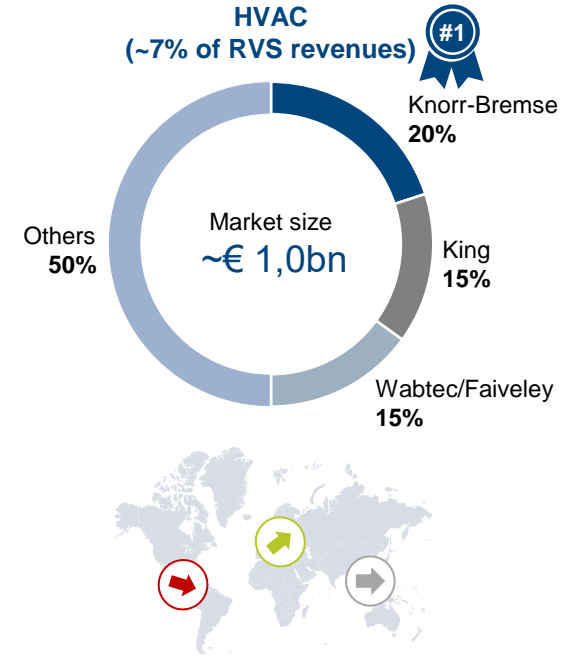
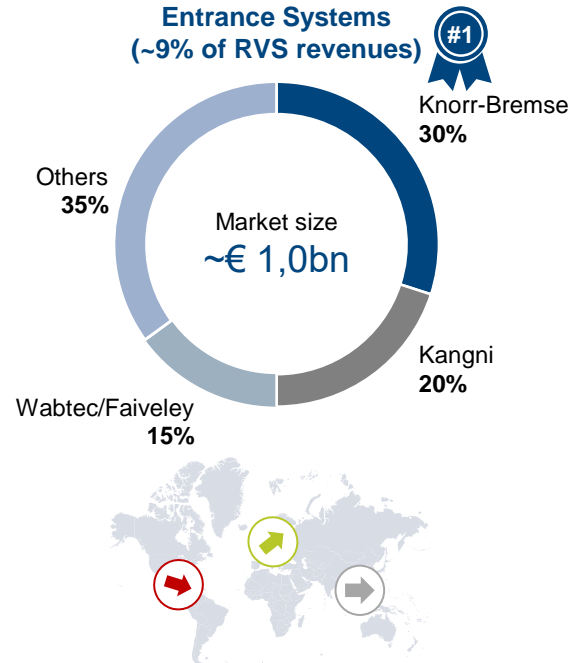
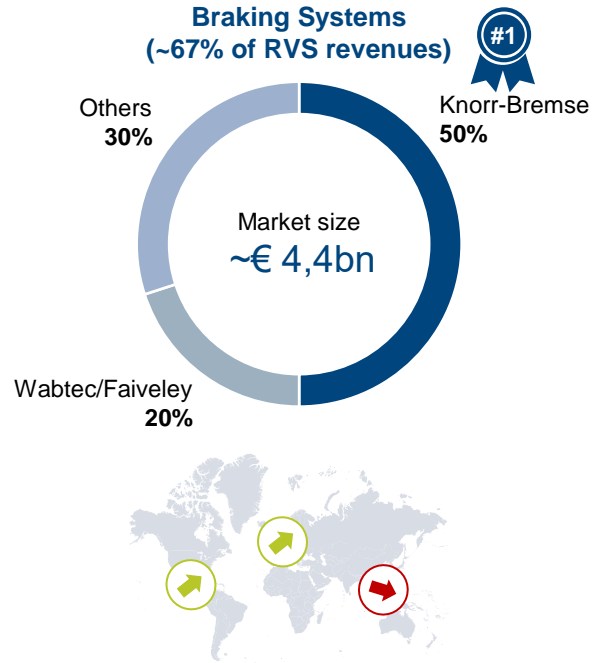


Notes: 2022 sales and customer data based on 31.12.2022; Share of top 10 customers as % RVS sales 2022 may not add up due to rounding; ¹⁾ incl. ex-Bombardier, excl. JV

RVS holds global #1 position across key product categories



Global market share 2022¹ (% of revenues)



1) Market share based on deliveries, estimates for OE and AM without labor, rounded to the nearest multiple of 5%; For competitors, a price estimate was used; Note: Based on German GAAP (HGB); Source: Knorr-Bremse information and internal market research

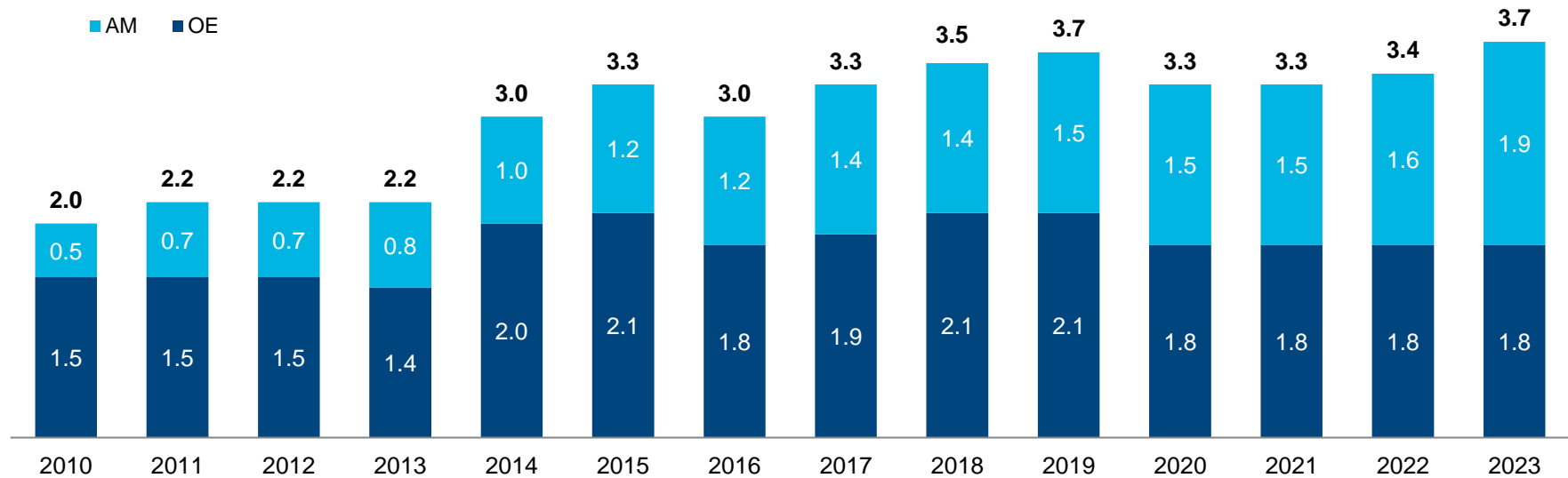
➡ Indication on Knorr-Bremse market share regional development 2021 to 2022 based on deliveries

Historic development of OE and AM business



Strong growth both in OE and AM

RVS sales by type (until 2017 German Gaap/HGB, 2018-2020 IFRS, €bn, 2010-2023) ¹⁾

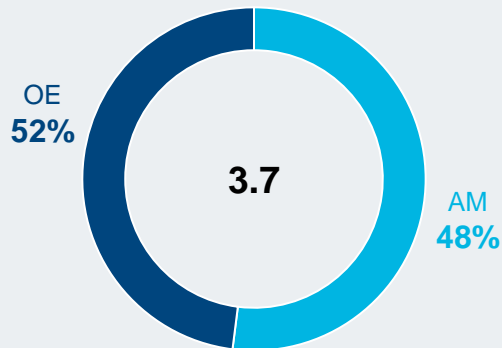


Note: some figures may not add up due to rounding; 1) BilRUG sales allocated proportionally between OE and aftermarket

Aftermarket business will continue to be an important growth engine



Revenue split
2023 in €bn



+ Opportunities



Use installed fleet



Modernization



New service models & digital solutions

— Challenges

- Competition by OEMs, focussing more on service
- Insourcing and lifecycle costs optimization, incl. stretching overhaul cycles

CO₂ emission targets not achievable in transportation without rail

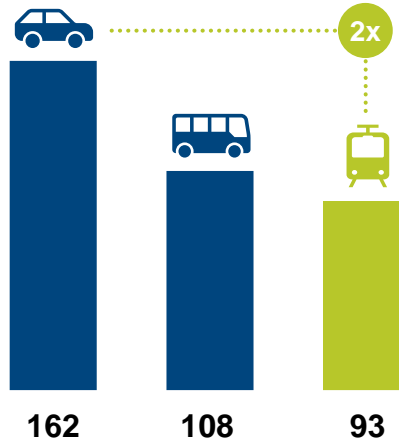


Greenhouse gas emissions from transport¹

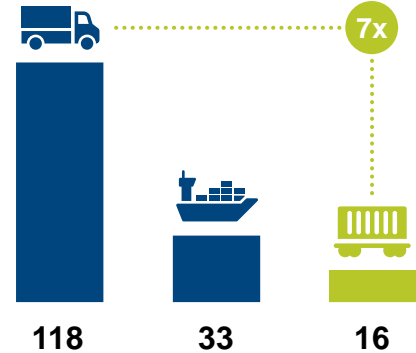
Passenger transport – long distance [in g/pkm]



Passenger transport – local transport [in g/pkm]



Freight transport [in g/tkm]









1) Reference year 2021, source: <https://www.umweltbundesamt.de/themen/verkehr/emissionsdaten>, accessed on May 16th, 2023

















RVS is the only supplier world-wide certified for all local standards and norms



Market protected by unique level of complexity ...

	Major global standards	4
	Unique configurations for vehicle types	7
	Brake subsystems	3
	Safety-critical components	>100
	Country- and customer-specific variants	Multiple
	100k active brakes articles to homologate	

... and long homologation time for each component

Standard ¹⁾	Key regions	Typical time-to-market	
		Development (yrs) ²⁾	Certification (yrs) ²⁾
			
			
			
			

Combination of IP ownership and homologation creates high barriers to entry

1) GOST based on recent homologation process, other norms based on expert estimates by Knorr-Bremse; 2) Estimated average required "time-to-market" of a basic freight car solution

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CVS with high-quality business model: outperformance and resilience



Market leadership

A global market leader
increasing market share (~23% for brake systems & vehicle dynamics)



Strong growth profile

Continuously **outperforming markets with rising content per vehicle** (5% sales CAGR vs. ~2% TPR growth between 2012-2021)



Technology innovation

Technology leader with continuous significant **investment in innovation and R&D**



High safety requirements

Global key supplier with **system know-how** and **vehicle dynamics capabilities**



Resilience

Strong aftermarket share (~29% revenue share), **cost efficiency**, regional **diversification** as well as track record in **strong cost management execution**




Profitability


Technology differentiation, superior products, systems approach, scale advantage and consequent **cost management**


CVS: one of two global leaders with an outstanding position in braking and safety-relevant systems



Highlights

**Global market position¹⁾**

**Technology leader**

**Global market share**

**c.14k Employees**

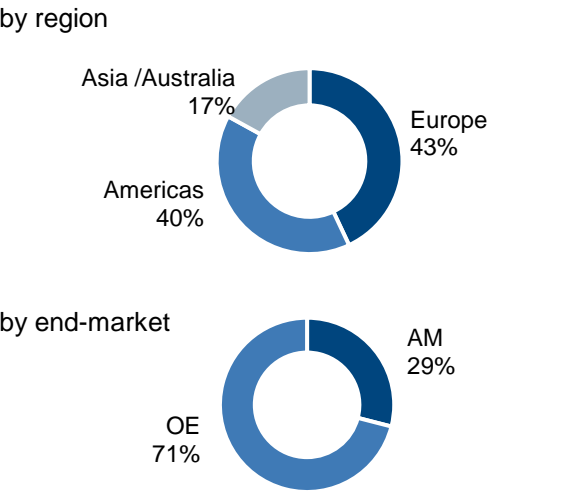
2023 key financials

€4.2bn sales

€417m op. EBIT (9.0% margin)

29% aftermarket share

2023 sales split³⁾



Notes: Sales, EBITDA, EBIT and respective margins based on IFRS; other figures based on German GAAP (HGB) 1) 2020 global addressable Truck, Bus and Trailer OE market,; 2) Total reported CVS sales growth including OE and AM 3) Sales split by region based on IFRS; Other splits based on German GAAP (HGB)

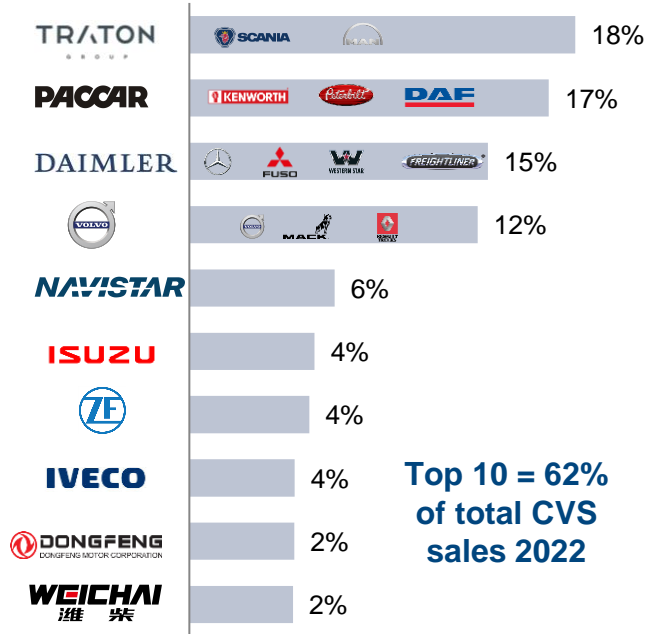
Knorr-Bremse is the partner of choice for global OEMs with long-standing relationships



Top 10 customers 2022 (% of sales)

Years of relationship

Other major Knorr-Bremse customers



>90
>30
>90
>30
>20
>30
>30
>90
>5
>5

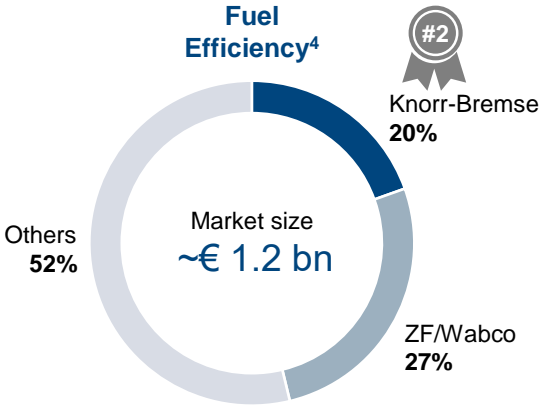
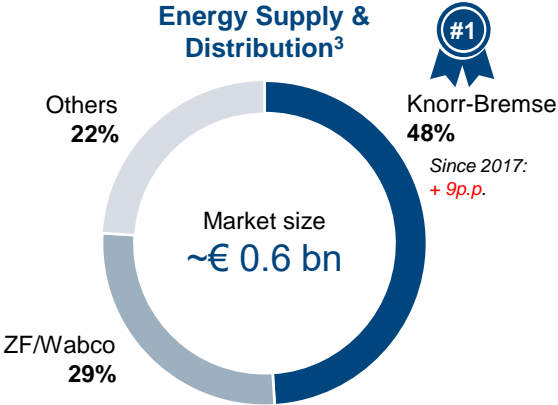
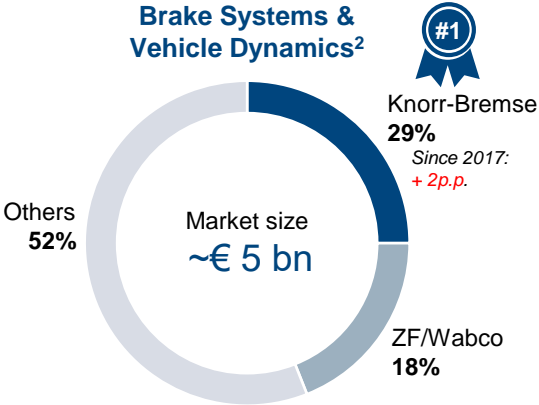


Note: Share of top 10 customers as % CVS sales 2022 may not add up due to rounding

CVS is market leader in all major product fields



Global market share 2022¹ (% of revenues)



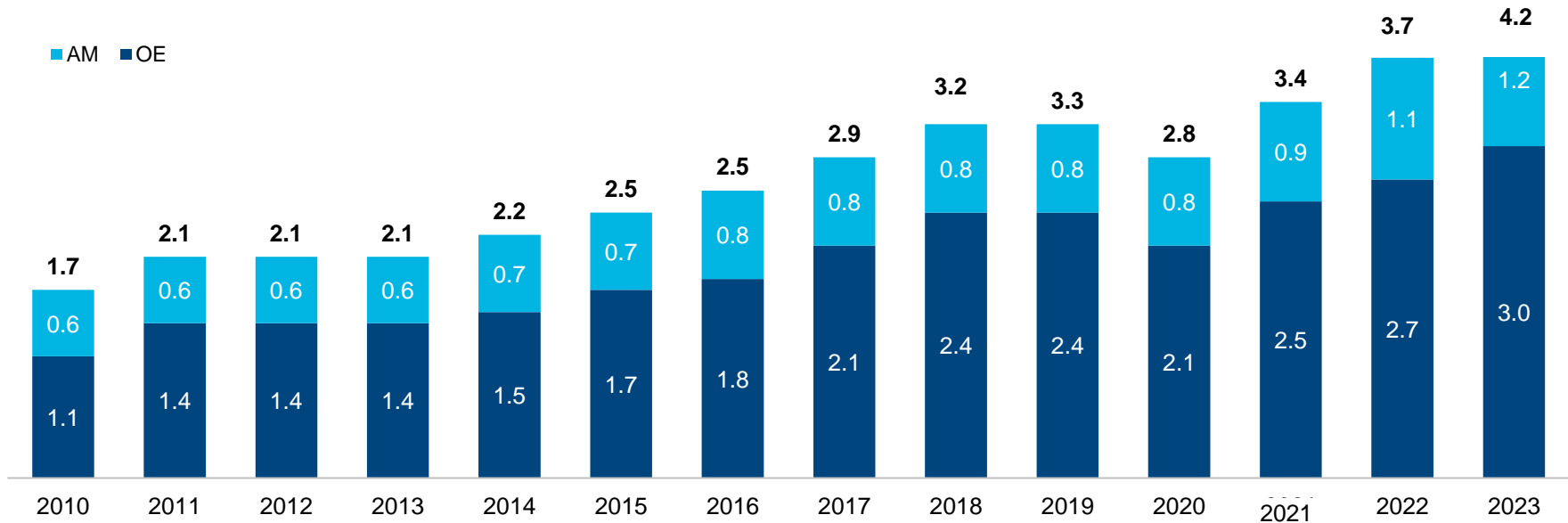
1) 2022 estimated addressable Truck, Bus and Trailer OE market, incl. "Brake Systems & Vehicle Dynamics (incl. Automated Driving)", "Energy Supply & Distribution" and "Fuel Efficiency"; excl. aftermarket; Knorr-Bremse data 2) Air Disc Brake, Valves / Pedal Unit, Actuators, Foundation Drum Brake, Steering, ABS, EBS, ESP, DAS, ELC; incl. segment Others 3) Compressors, Air Treatment 4) Vibration Dampers, Engine Air Control, Transmission – Gear and clutch actuation

Historic development of OE and AM business



Strong growth both in OE and AM

CVS sales by type (HGB, €bn, 2010-2017)1) 2018-23 IFRS

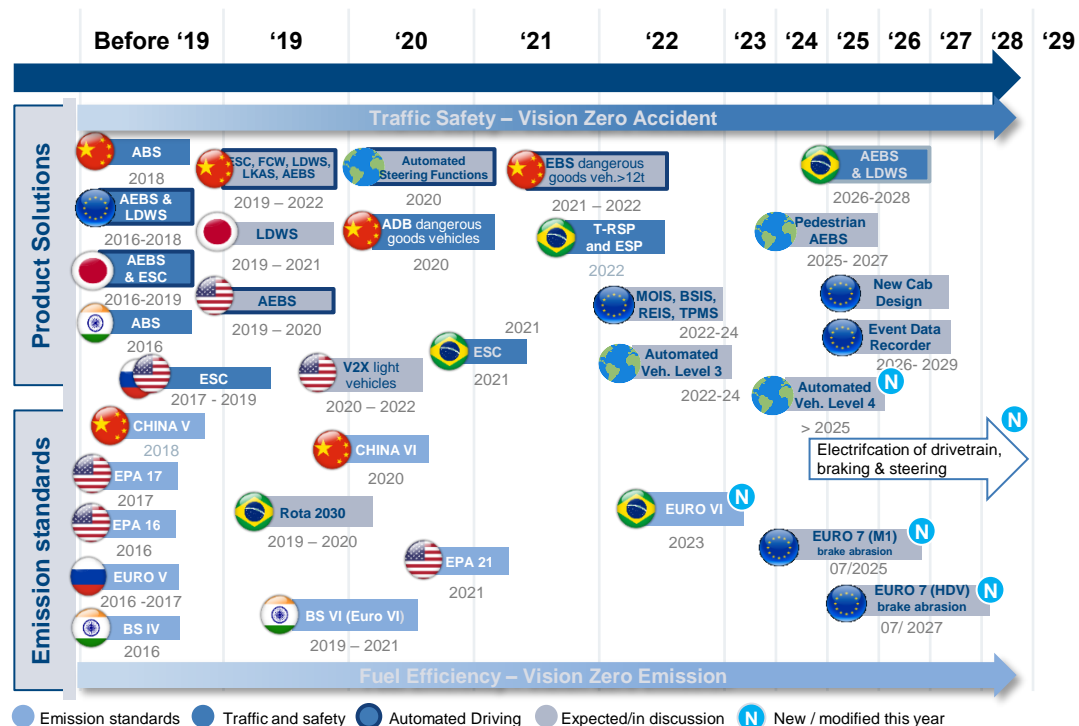


Notes: Some sales split may not add up due to rounding 1) BilRUG sales allocated proportionally between OE and aftermarket; 2) Global Truck and Bus market excluding aftermarket and Trailer; Source: Knorr-Bremse information and internal market research; IHS for truck production rate

Electrification, Brake Emissions and Software



Changes in Regulations as Growth Driver



Legislative decisions foster demand for Knorr-Bremse solutions

Higher Content per Vehicle (CpV) will fuel CVS's growth in the future

2023-2028E


CVS CpV
growth p.a.

Global

~ 4%
(average)

North America

Below average

Western Europe

On average

Asia

Above average

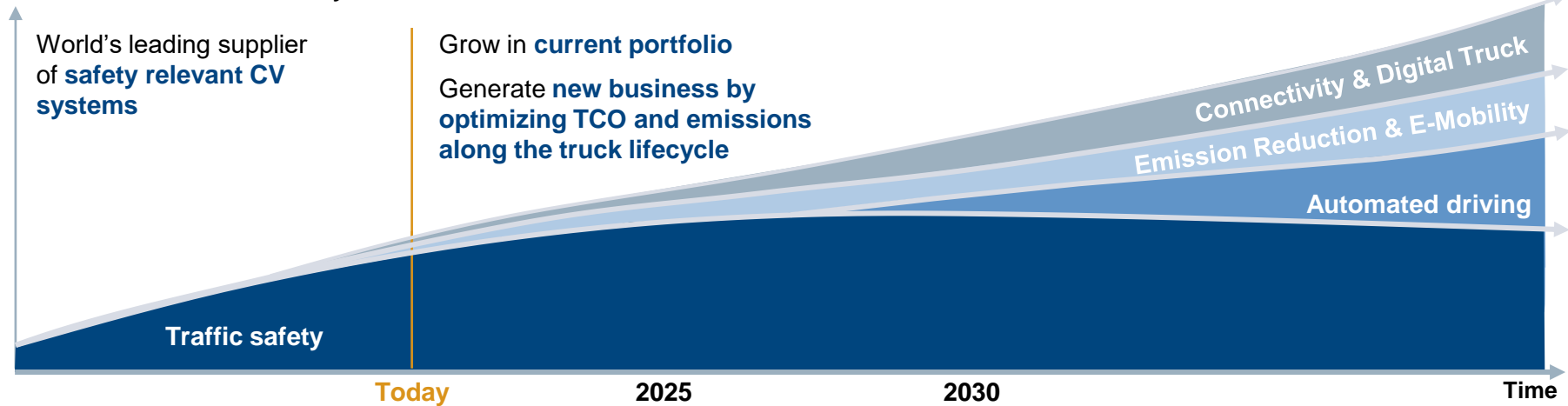
- E-mobility and autonomous driving to fuel CpV growth
- Advancement in safety features is a growth catalyst in Asia
- Especially, **China market growth** driven by **increases in Air Supply and Drivetrain**
- In North America, **KB CpV is already at high levels** – technological adaptations and enhancements prevail

New growth areas for CVS



Illustrative growth potential

Growth contribution of industry trends



Current CVS portfolio with focus on traffic safety perfectly fits market demands

In the future however, CVS will gain more content per vehicle growth with solutions for Automated Driving, Emission Reduction & E-Mobility and Connectivity

The Cojali Group is a Spanish Diagnostics expert with strong offerings in All-Makes Diagnostics, Remote Diagnostics and Alternative Specification

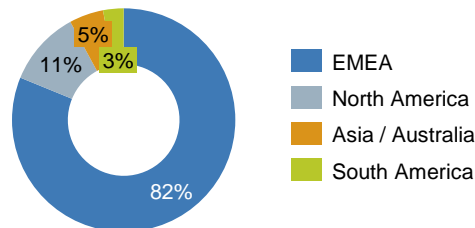
Key facts

- Headquarter:
 - Campo de Criptana, Spain
- Subsidiaries:
 - Cojali US
 - Cojali France
 - Cojali Italy



Regional presence

Cojali products are available in 135 countries



Financial KPIs

Sales 2022: **>90 mEUR**

R&D Share: **~7%**

Employees **~550**

Key Product Categories

Brands



All-makes Diagnostics & Workshop Tools

Solutions for trucks, trailers, buses as well as LCV, Off-Highway and Marine



214
BRANDS
6,027
MODELS

Telematics & Remote Diagnostics

Fleet Management and Remote Diagnostics for Commercial Vehicles

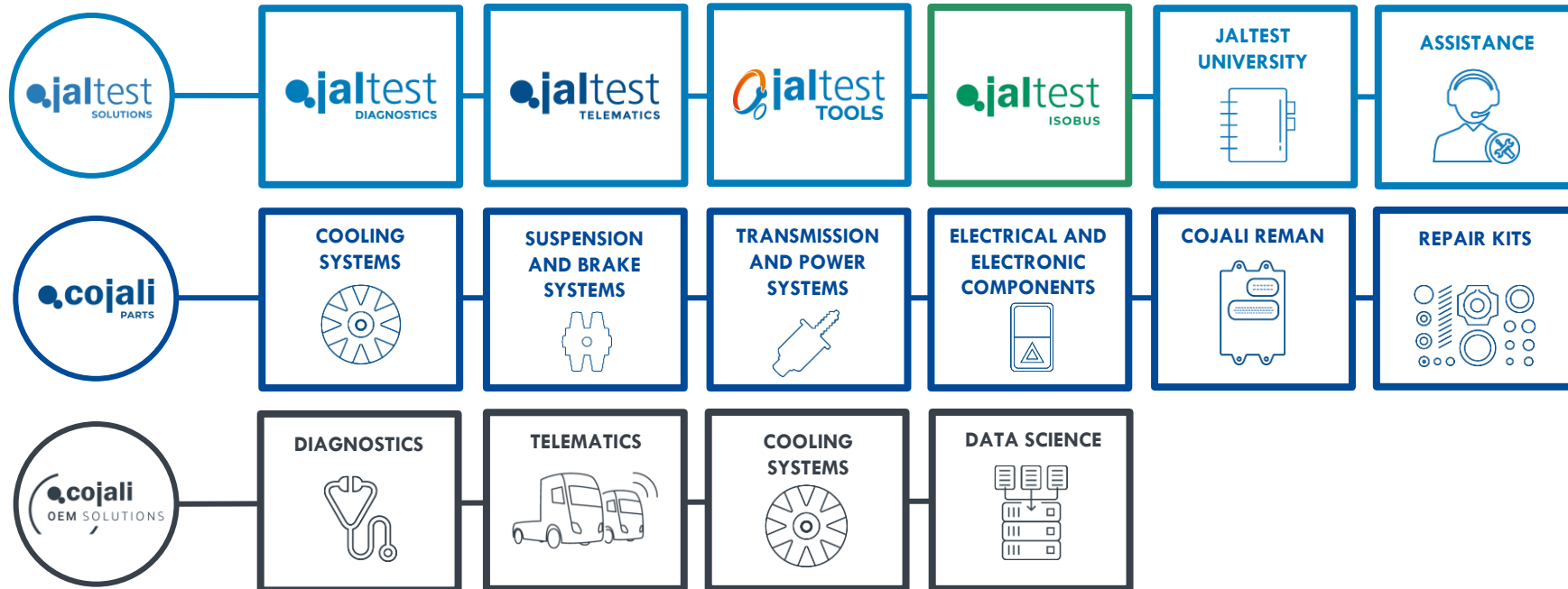


Alternative Specification

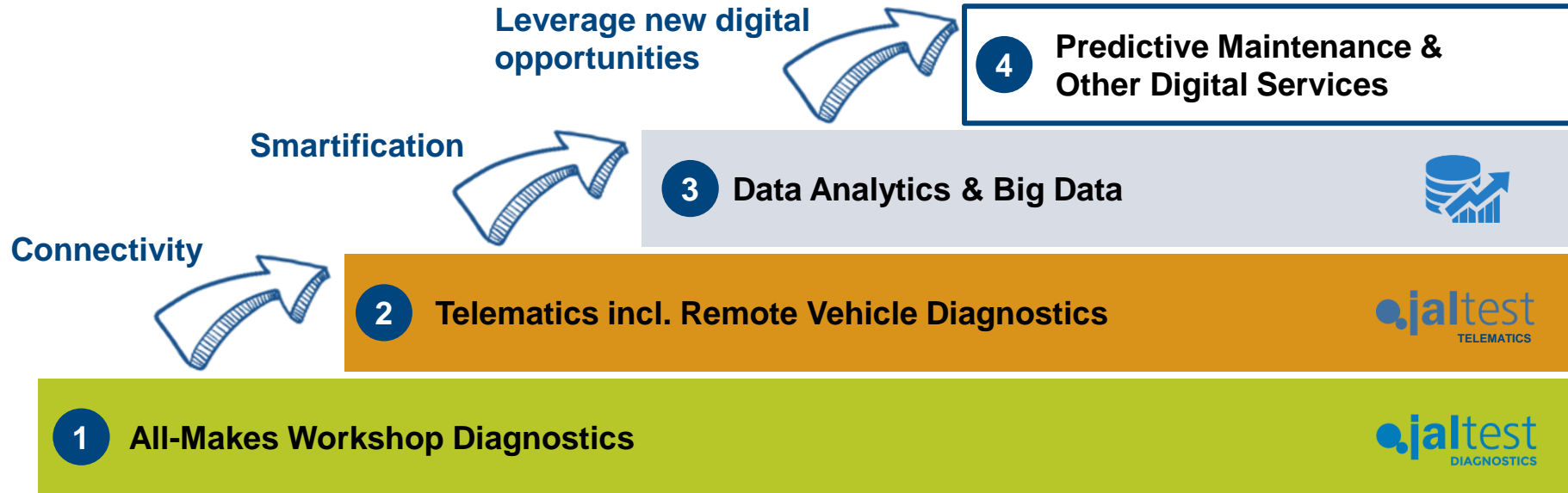
Air Brake, suspension, transmission, electric and cooling system components



Cojali's product offerings



Cojali enables Knorr-Bremse to strengthen its position as system supplier in the global growth market of digital solutions and data-driven services



CVS – fascinating its customer with best-in-class products and setting clear focus areas on leading industry trade shows



Selection of focus areas

HIGHLY AUTOMATED DRIVING

TRUCK MOTION CONTROL

PERCEPTION

Complete environment perception of truck & trailer

DECISION

Continuous situation analysis, motion planning and definition of driving path

ACTUATION

Coordinated interaction of actuators for vehicle dynamics

Virtual Driver

Truck Motion Controller

Sensors Sensor data fusion Global tracking HAD ECU Safety power supply Brake system Steering Propulsion Retarder

REDUNDANT SYSTEMS

e.g.,

Redundant Brake System

Redundant Steering System (e.g., Electric Power Steering)

Redundant Power Management Systems

ELECTRIFICATION

e.g.,

Rotary Vane E-Compressor

Screw Compressor

IAA Transportation

Automechanika

Innovation award at Automechanika for “Parts & Technology Solutions”

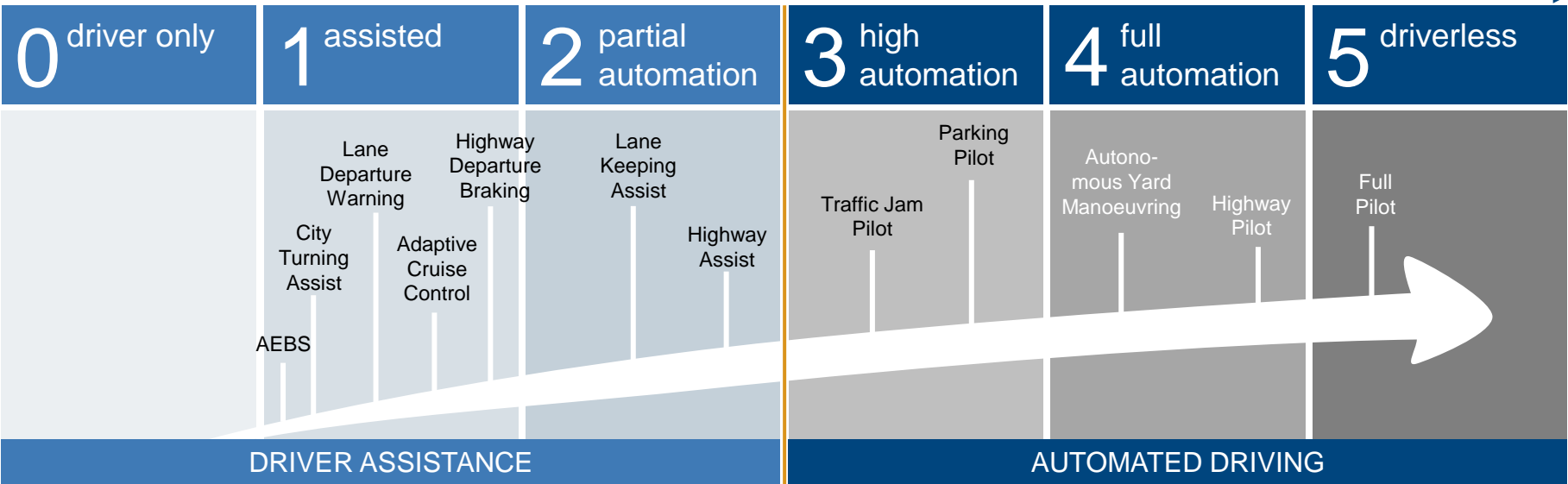
KNORR-BREMSE

50

CVS offers both driver assistance and automated driving solutions



degree of automation →



CVS as a system supplier

- Braking
- Steering
- Sensors
- Level 1 and 2 functions



Air Disc Brake



Steering



Brake Control



CVS as vehicle dynamics supplier

- Braking
- Steering
- Vehicle dynamics
- Related redundancy

Brake control



CV system competence

Steering

Vehicle dynamics / Truck Motion Control



KNORR-BREMSE

CVS is offering a broad product portfolio for electric trucks



EV adapted portfolio

SELECTED
EXAMPLES

eCompressor

- Electric screw compressor
- Mid air demand eCompressor (rotary vane)
- Low air demand compressor for future EV requirements



EV brake control & vehicle dynamics

optimized and scalable holistic EV motion control, including energy recuperation



EV wheel brake

Building block system for future EV generations



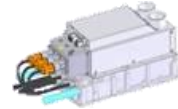
New EV product fields

SELECTED
EXAMPLES

Redundant power management system



EV brake resistor



Opportunities in H2 vehicles



on the market



market launch soon



in development



in assessment



KNORR-BREMSE

Agenda

- Introduction
- Key Company Highlights
- Rail Vehicle Systems (RVS)
- Commercial Vehicle Systems (CVS)
- **R&D Focus**
- Financials
- Sustainability
- KB shares/ KB bonds
- Appendix



Focused R&D investments define product roadmap for KB

Strong R&D base...



5
Global R&D
centers



6-7%
Long-term
R&D ratio



~ € 490m
R&D expenses
(FY22)



> 12k
Patents
worldwide

...to shape product innovation¹...

Roll-over products:

Electric Power Steering

Product upgrades:

Condition monitoring

New products:

Digital automatic coupler

Scope increases:

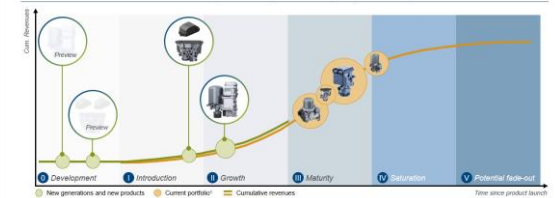
Aftermarket ecosystem

...with effective tracking in place

CVS brake control and air treatment systems – safeguarding long term technology leadership

CVS brake control and air treatment systems in product lifecycle (indicative)

Illustrative and exemplary

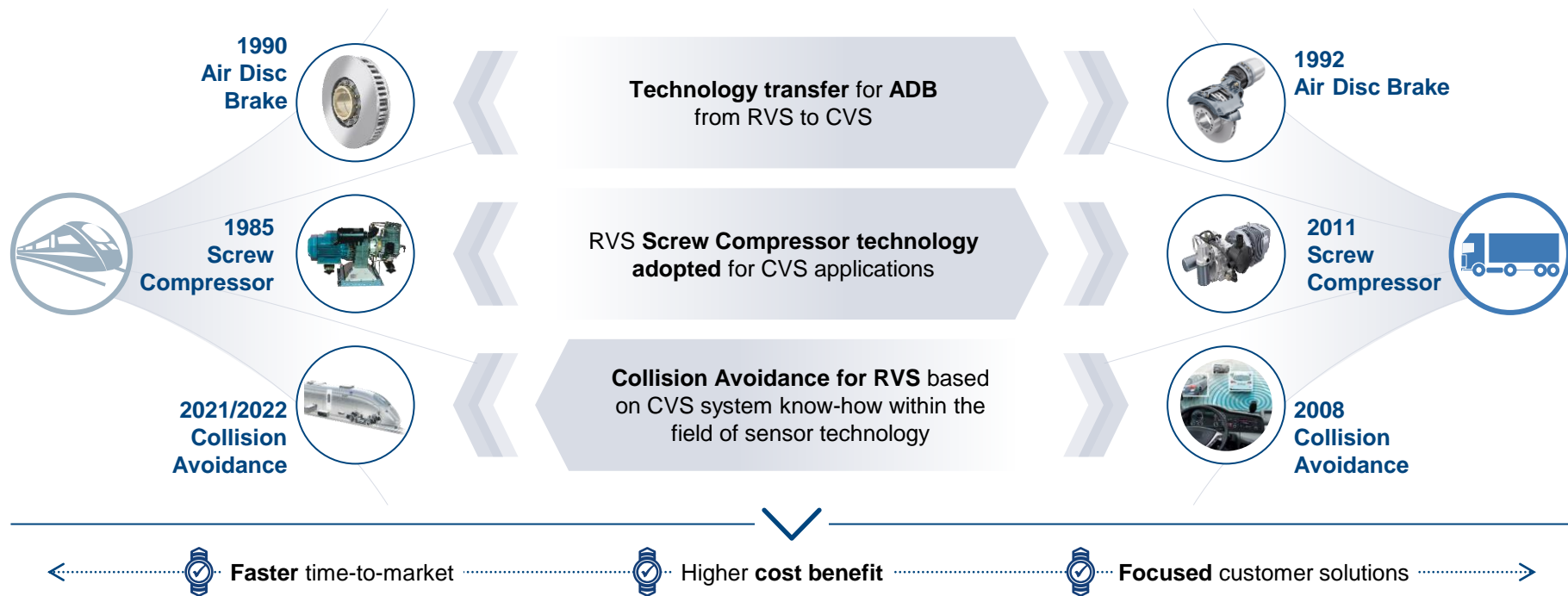


- R&D project tracking
- Rigorous monitoring of S-curves along maturity stages
- Analysis of roll-over products / substitution and new products

1. Including examples

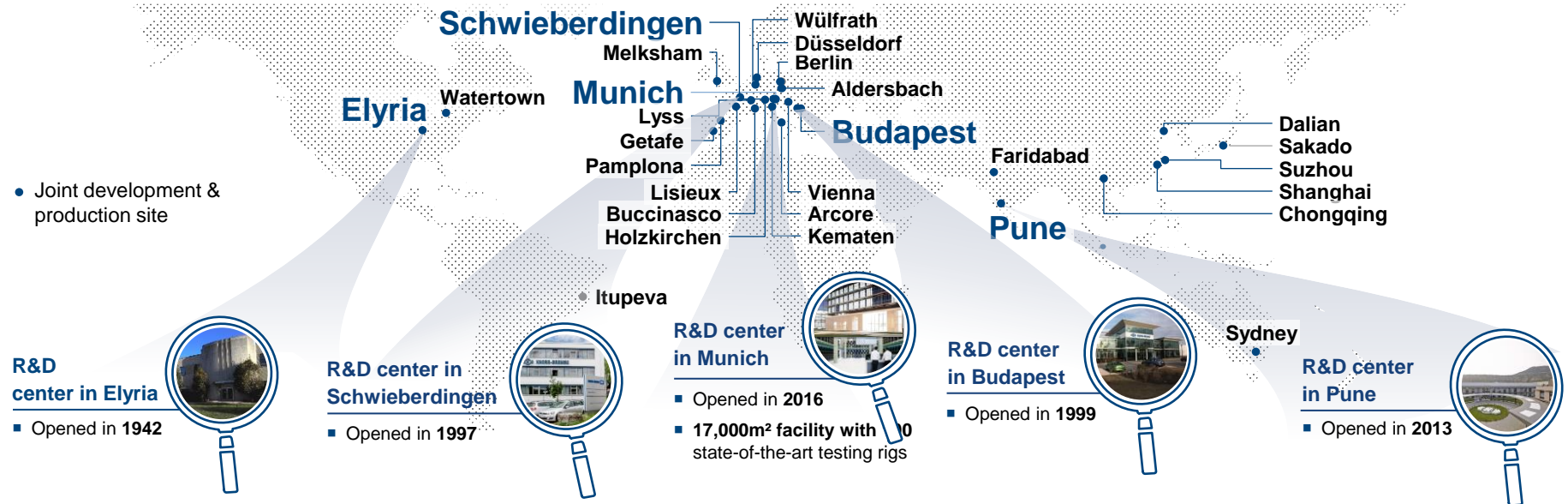
R&D: Synergies and cross-proliferation

Cross-divisional R&D examples



Leveraging Knorr-Bremse's synergies & partnerships: centres of excellence as basis for sustained technology leadership

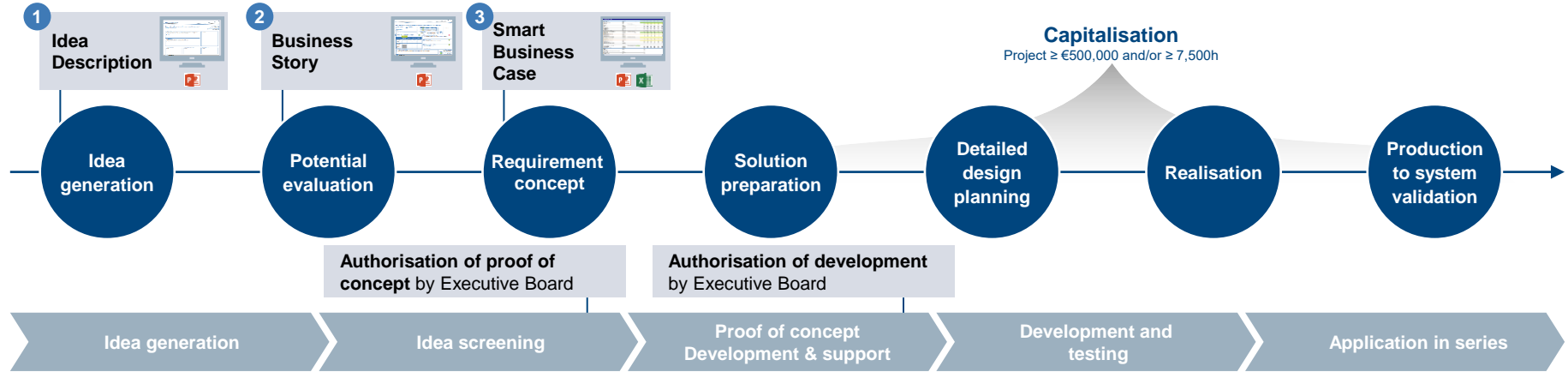
Globally $\Sigma >4,000$ FTE



Knorr-Bremse's innovations are supported by a network of specialized development centres with joint production and R&D

Knorr-Bremse deploys structured and effective processes to drive innovation results

Knorr-Bremse R&D process



Knorr-Bremse's innovations are designed for clear customer impact...

- 💰 Optimisation of TCO¹⁾
- 🔧 Reduction of energy consumption, noise, weight
- 🔒 Safety & reliability
- 🌐 Connectivity, wireless solutions, ethernet
- 🔧 Adaption to regulation

...and maximum economic benefit for Knorr-Bremse

- 📈 All projects assessed based on NPV²⁾
- 🔍 Prioritisation of projects according to IRR³⁾
- 🕒 Optimise time-to-market
- 💰 Short payback time of investment
- ✅ Ability to leverage innovation across customer portfolio

Notes: 1) TCO refers to total cost of ownership; 2) NPV refers to net present value; 3) IRR refers to internal rate of return

Close co-operation with customers & strategic partners

Government partnerships

- Shift2Rail: EU supported initiative amongst suppliers and OEMs to jointly develop an efficient transportation system
- VDA¹⁾ participation in ~20 committees
- ✓ Design of norms/standards
- ✓ Early anticipation of industry trends
- ✓ Grants/subsidies



Partnerships with Universities

- Research cooperations
- ✓ Access to future talent
- ✓ Scouting of new technologies at minimal cost



VC partnerships with Start-ups

- Partnerships with accelerators
- Investment in start-ups
- ✓ Technology access
- ✓ R&D acceleration



Acceleration of
PRODUCT INNOVATION
in digital age requires
DIVERSE PARTNERSHIPS
to outperform competitors

JVS with OEMs / technology partners

- 18 joint ventures globally
- Joining complementary competences to extend product and service lines, and capacities
- ✓ IP protection
- ✓ Local presence
- ✓ Flexible solutions for customers



🌐 Countries Knorr-Bremse is present

Notes: 1) VDA - Verband der Automobilindustrie (German Association of the Automotive Industry)

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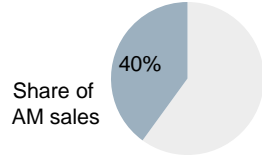


Status Quo | Despite a challenging environment, KB's very solid financials are a strong foundation for the transformation



Robust topline growth & high AM share

FY23



€ 7.1bn

YE23
Order Book

Record
high

High cash conversion potential



Free cash flow

€ 552m

FY23

CCR

96%

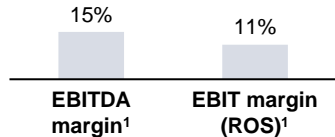
~ 93%

CCR
(average 2019-23)



Strong profitability potential

FY23



~ 19.5%

ROCE

~ € 3.4

EPS

Financial
position

Highly resilient balance sheet



MOODY'S



STANDARD
& POOR'S



FY23

Net debt ratio

~ 0.5x

Gross debt ratio

~ 1.7x

Equity ratio

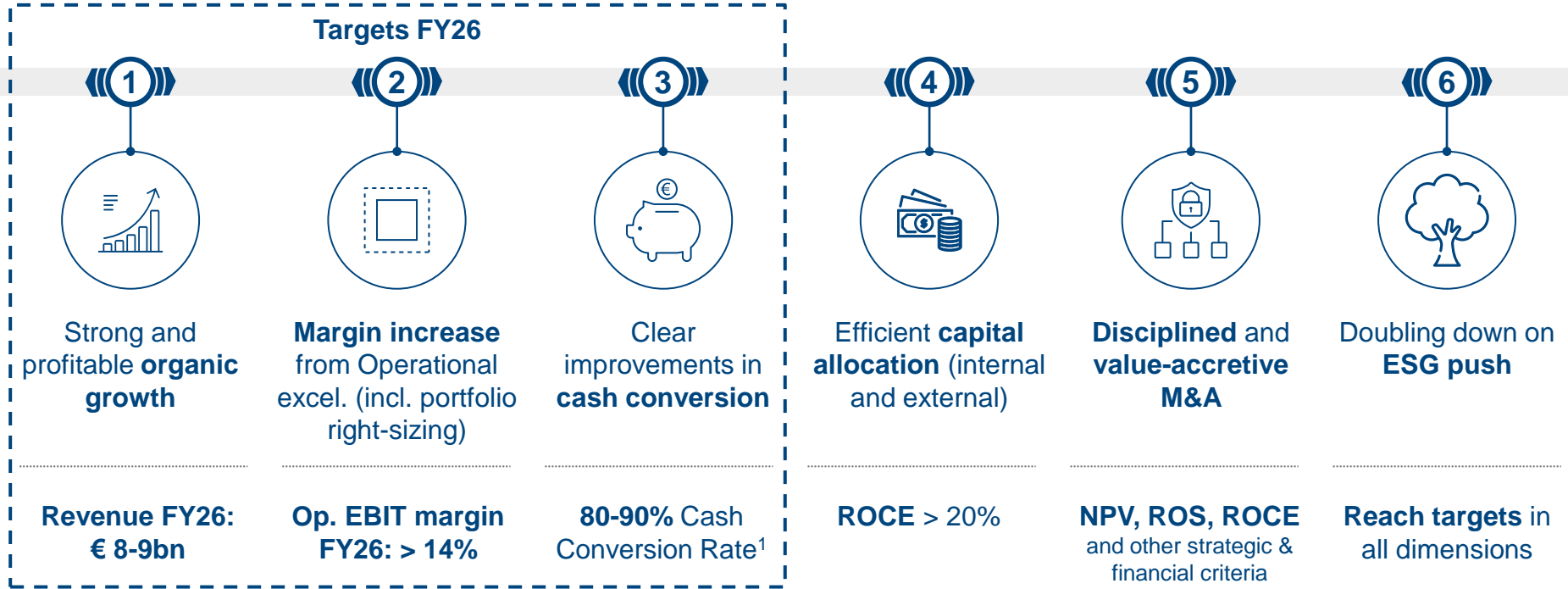
35%

Liquidity

~ € 1.4bn

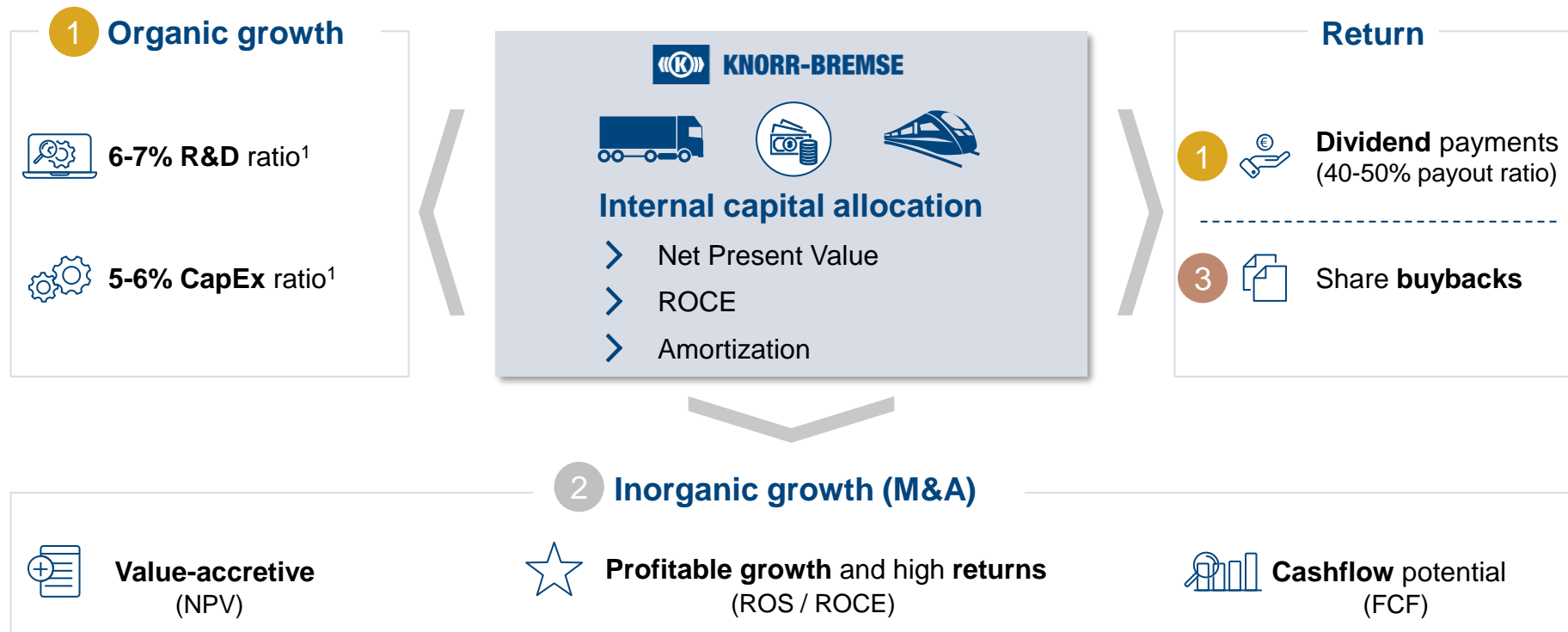
1. Operating EBITDA and EBIT

Financial Strategy | KB target picture translates into clear financial targets supporting profitability growth



1. CCR: Cash Conversion Rate = FCF / Net Income

Capital Allocation | Our clear priorities 1 - 3 to safeguard efficient capital allocation



1. In % of revenues 1 2 3 Level of priority

M&A | Disciplined approach based on a holistic set of updated M&A criteria will guide future acquisitions as add-on to organic growth

Strategic focus



Capital goods (no automotive)

and



Soft / hard synergies and / or KB as best owner

and



OE, aftermarket and / or **services**

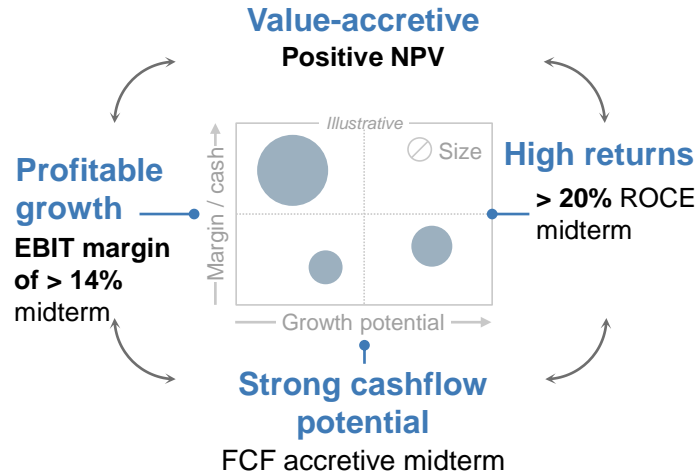
and / or



Digital capabilities and / or **solutions**



Financial guardrails for larger transactions

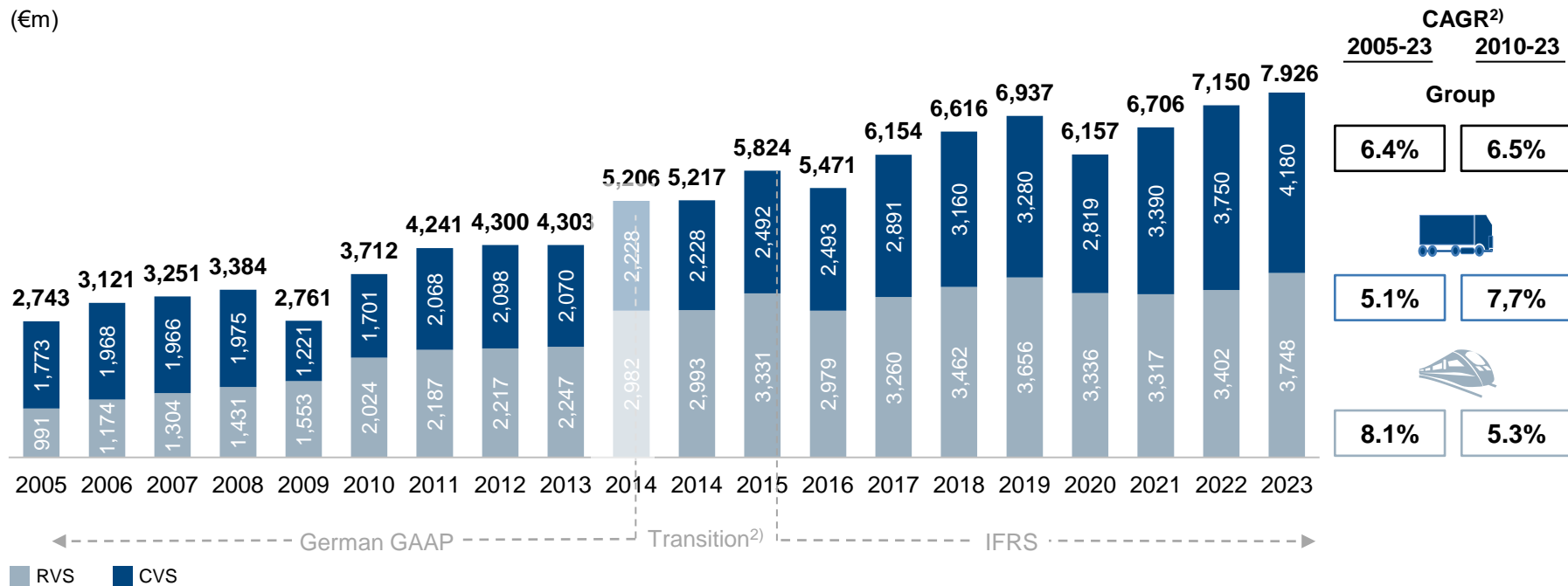


- **No larger restructuring cases** (< € 50m revenue)
- No significant barriers to **integration**
- Contribution of strong **AM business**
- **Leverage must support investment grade of KB**
- **Expansion beyond RVS and CVS (Greenfield)** only if KB is **best owner**

Track record of strong and sustainable top-line growth ...

Historical sales¹⁾²⁾ by division

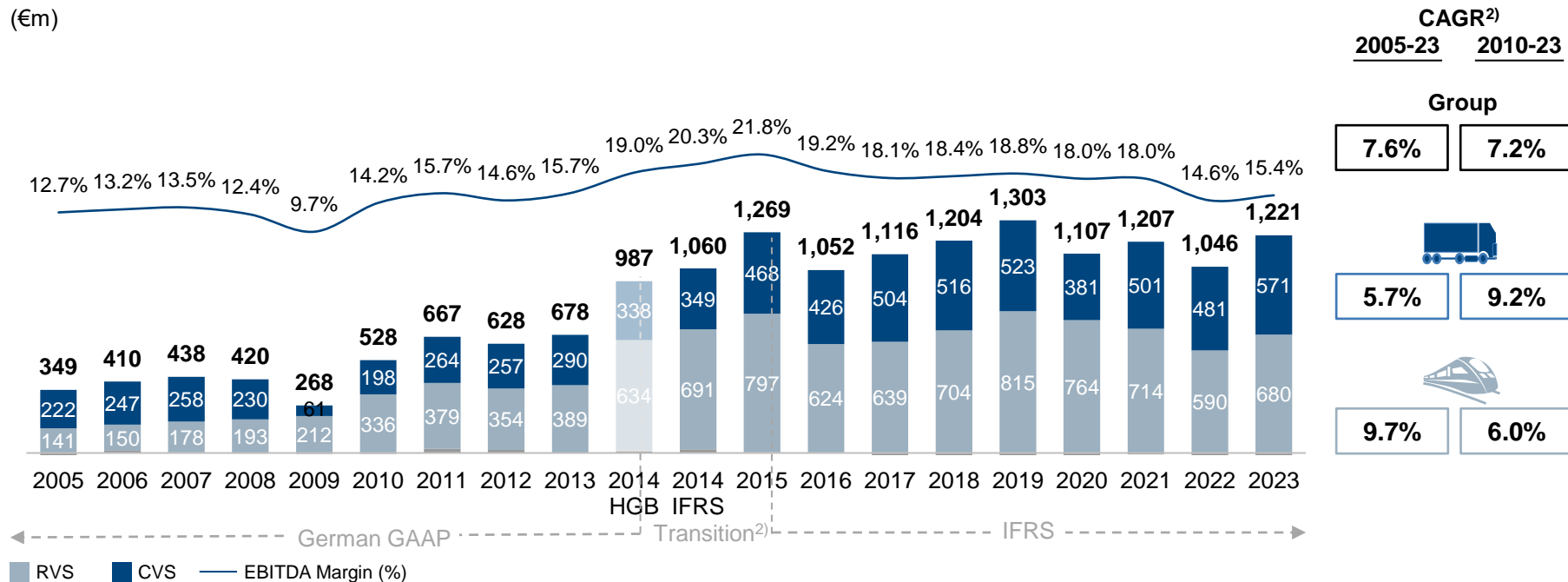
(€m)



... combined with disproportionate EBITDA growth

Historical EBITDA¹⁾²⁾ profitability

(€m)



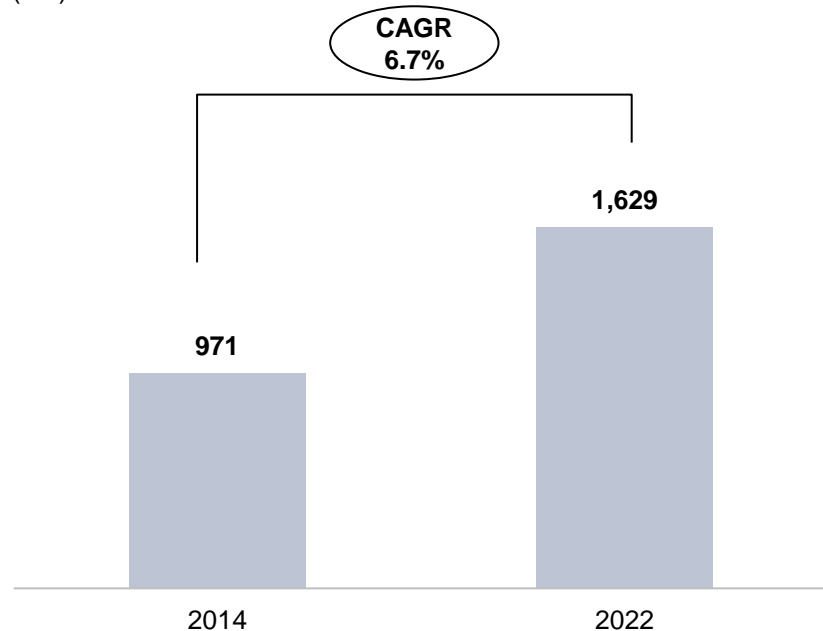
Notes: 1) Divisional historic figures do not add up to group sales excluding consolidations/other; 2) 2014 represents the first year that Knorr-Bremse prepared its financial statements in accordance with IFRS. Prior to 2014, financial statements were only prepared in accordance with German GAAP (HGB). IFRS differs in certain aspects from German GAAP (HGB), and accordingly data presented in accordance with German GAAP (HGB) may not be comparable to data prepared in accordance with IFRS;
Source: Knorr-Bremse information

... all supported by solid aftermarket sales growth

RVS – Aftermarket sales¹⁾



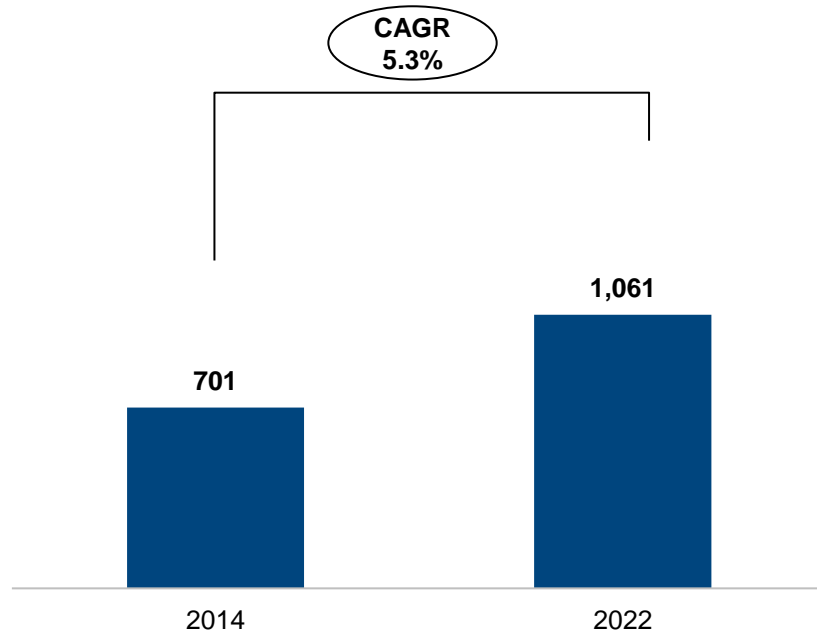
(€m)



CVS – Aftermarket sales¹⁾

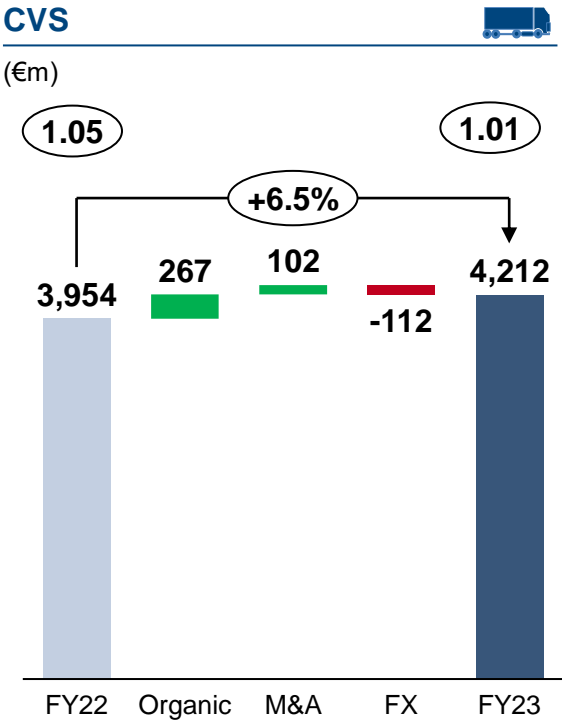
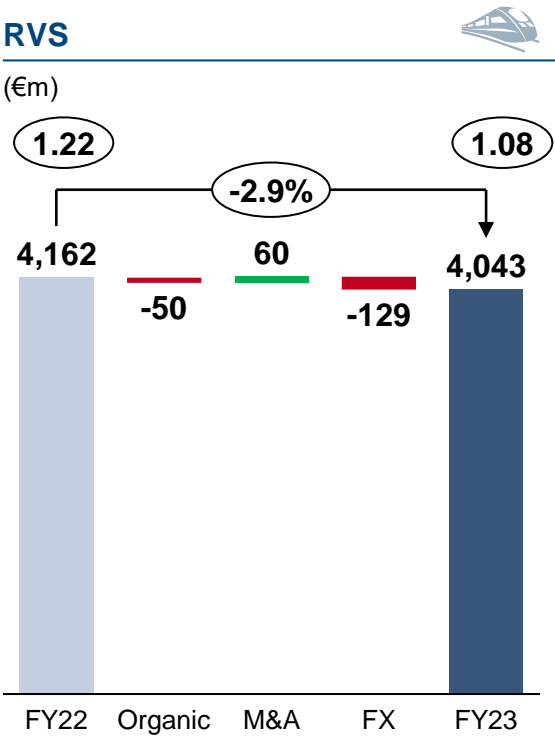
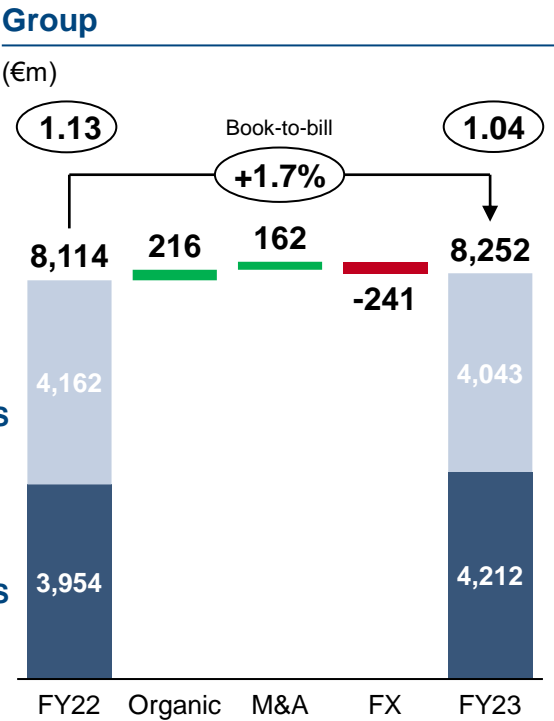


(€m)



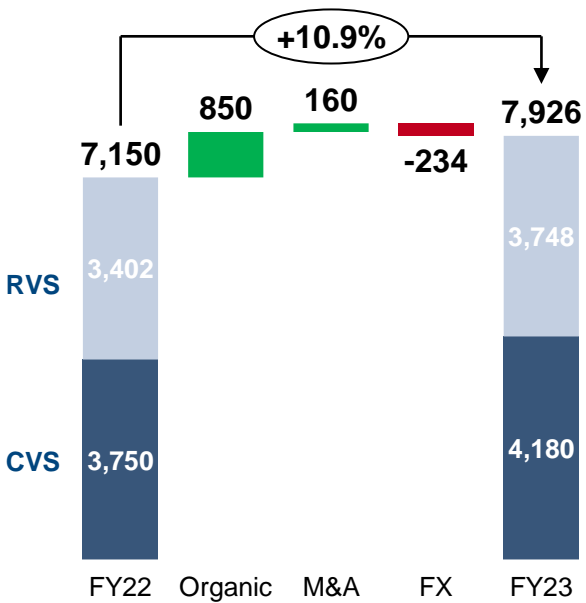
Notes: 1) Based on IFRS; BilRUG sales allocated proportionally between OE and aftermarket

FY23: order intake for Group, RVS & CVS

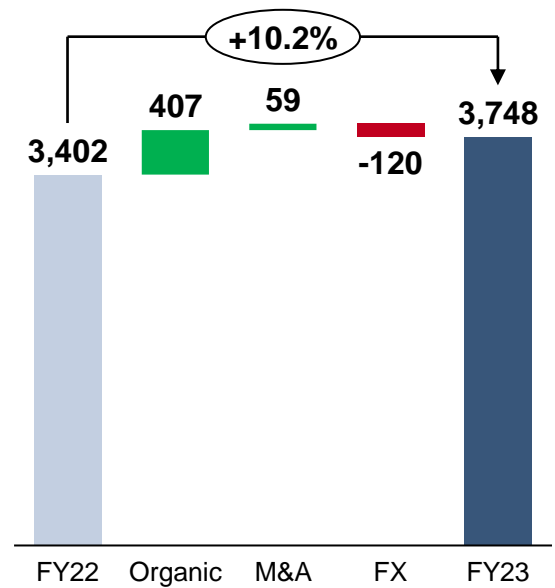


FY23: revenue for Group, RVS & CVS

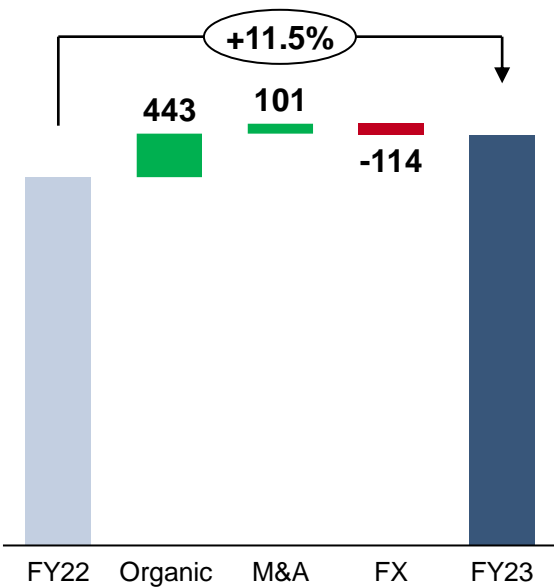
Group
(€m)



RVS
(€m)



CVS
(€m)



FY23: op. EBIT for Group, RVS & CVS

Group

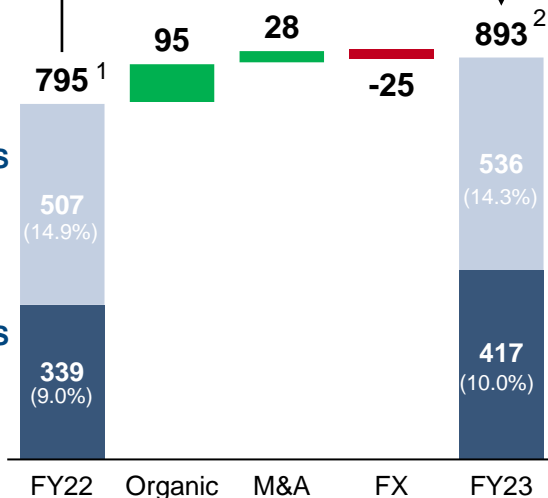
(€m)

11.1% 11.3%

+12.4%

RVS

CVS

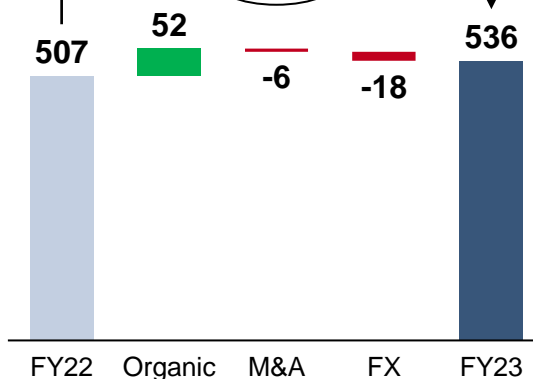


RVS

(€m)

14.9% 14.3%

+5.7%

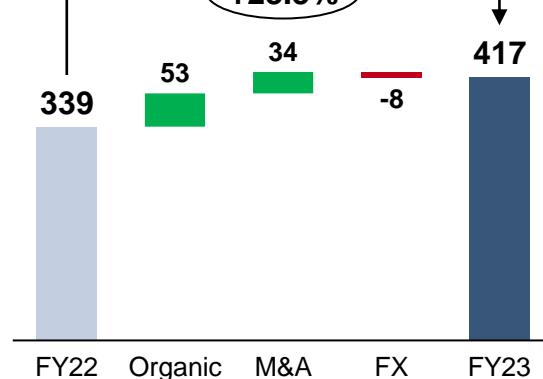


CVS

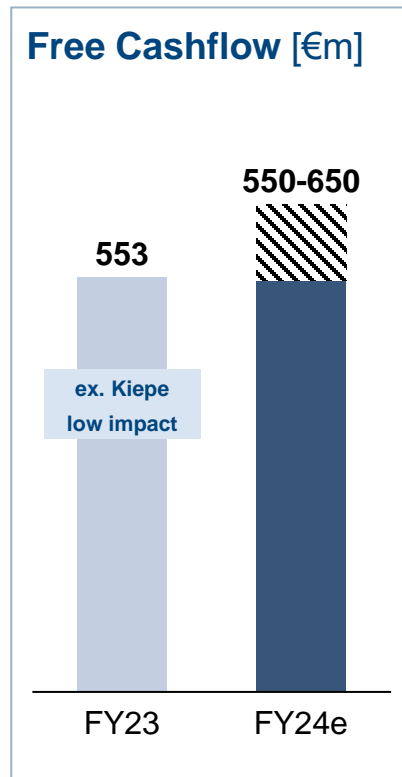
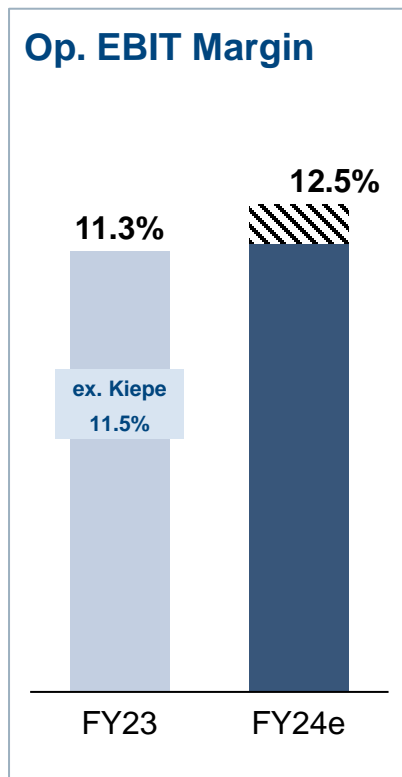
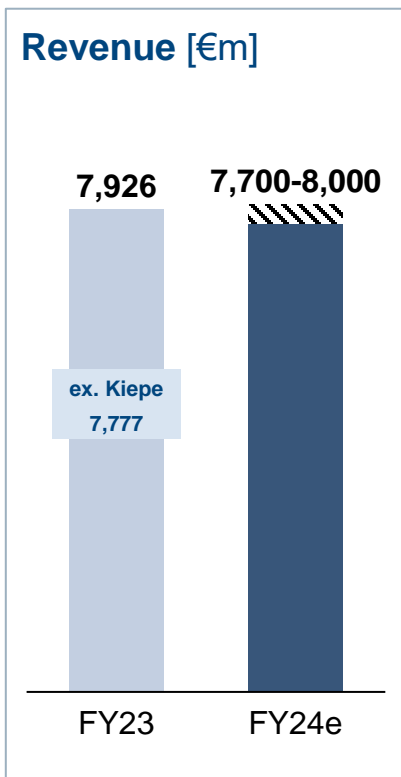
(€m)

9.0% 10.0%

+23.3%



Group guidance FY24¹



General Assumptions:

- Stable FX yoy
- Essentially stable geopolitical and macroeconomic conditions

Divisional Assumptions:

RVS:

- Solid organic revenue increase
- Solid EBIT margin increase

CVS:

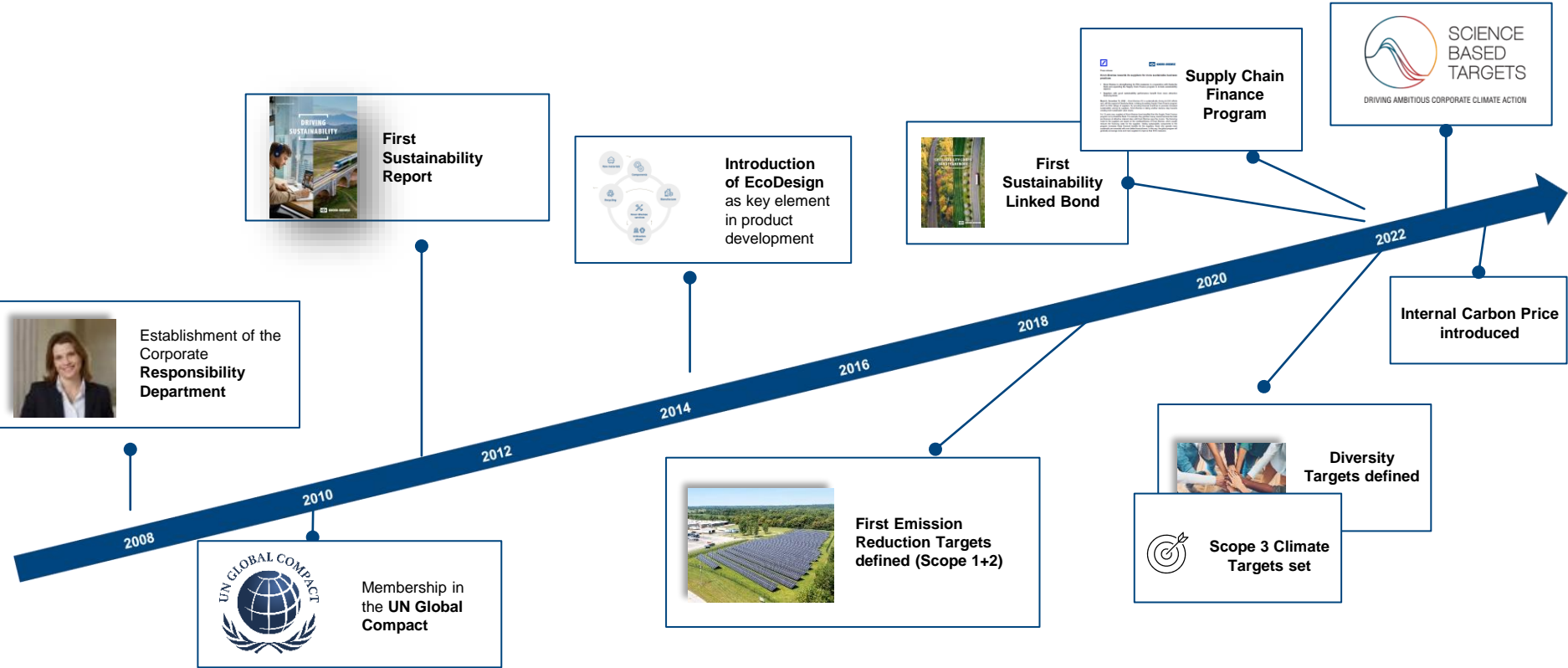
- Slight revenue decrease
- EBIT margin flat/ slight increase

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Knorr-Bremse's longstanding commitment to sustainability



Sustainability is a fundamental layer of Knorr-Bremse's corporate strategy

ESG: Anchored in our Vision for 2026...

Clear vision for 2026: Become strong capital goods company by successfully managing portfolio of robust assets



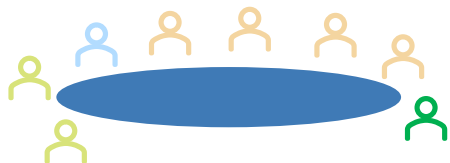
... and managed within a clear framework.



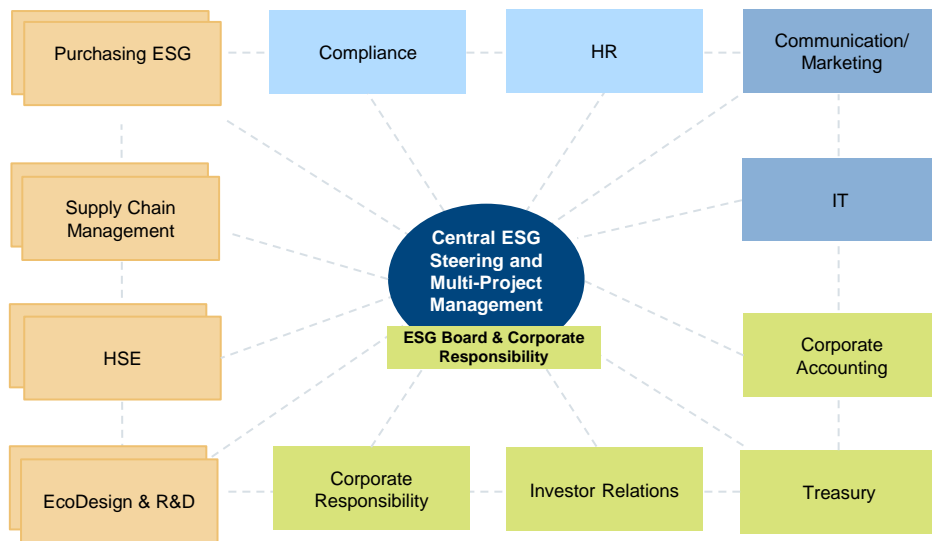
Strong Governance to steer Sustainability within the company

High-level ESG-Board

- **Executive Board, Divisions & Regions, Global Care e.V. & CR** represented
- Minimum **four meetings per year**
- **Strategic guidance, target & program monitoring, overall steering**



A strong operative ESG Network* for implementation



* Illustrative, more departments involved

Knorr-Bremse has defined ambitious short- and mid-term ESG targets

	Topic	Description	Target	
Mid-term targets	Climate Change	Scope 1+2 reduction (baseline 2018)	2030	-75%
	Climate Change	Scope 3 reduction (baseline 2021)	2030	-25%
	Diversity	Women in management level	2027	20%
	Diversity	Women in overall workforce	2027	25%
	Sustainable Supply Chain	Sustainability Assessments of Knorr-Bremse supplier (coverage rate based on spend)	2025	75%
Short-term targets	Energy Efficiency	Approved Energy Efficiency Projects	2023	5.4 GWh
	Employee Safety	Workplace accidents / 200.000 contracted working hours (TCIR)	2023	0.89
	ESG Ratings	Relative positioning of ESG Ratings (ISS + S&P + Sustainalytics)	2023	Top 11.5-14.5% Percentile



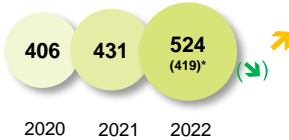
Remuneration
of Top-
Management
(STI)



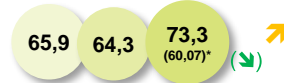
Facts & Figures 2022 – positive development in all three ESG dimensions

Environment

1) Total energy consumption (in GWh)



2) Energy efficiency in MWh / € 1m turnover



3) Scope 1+2 emissions (in ktCO₂)



Background:

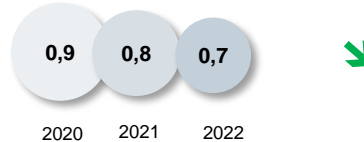
*(1-3) system boundary for calculation has been broadened due to integration of M&A activities

*compared to last years system boundary (organic only), positive development

* „organic“ growth (scope) without M&A

Social

4) Accident Rate (TCIR)



5) Share of female employees (in %)



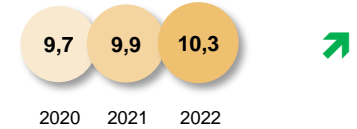
6) Share of female employees in management positions (in %)



** compared to FY2021 scope

Governance / Circularity

7) Revenue from refurbished/maintained products relative to total revenue (in %)



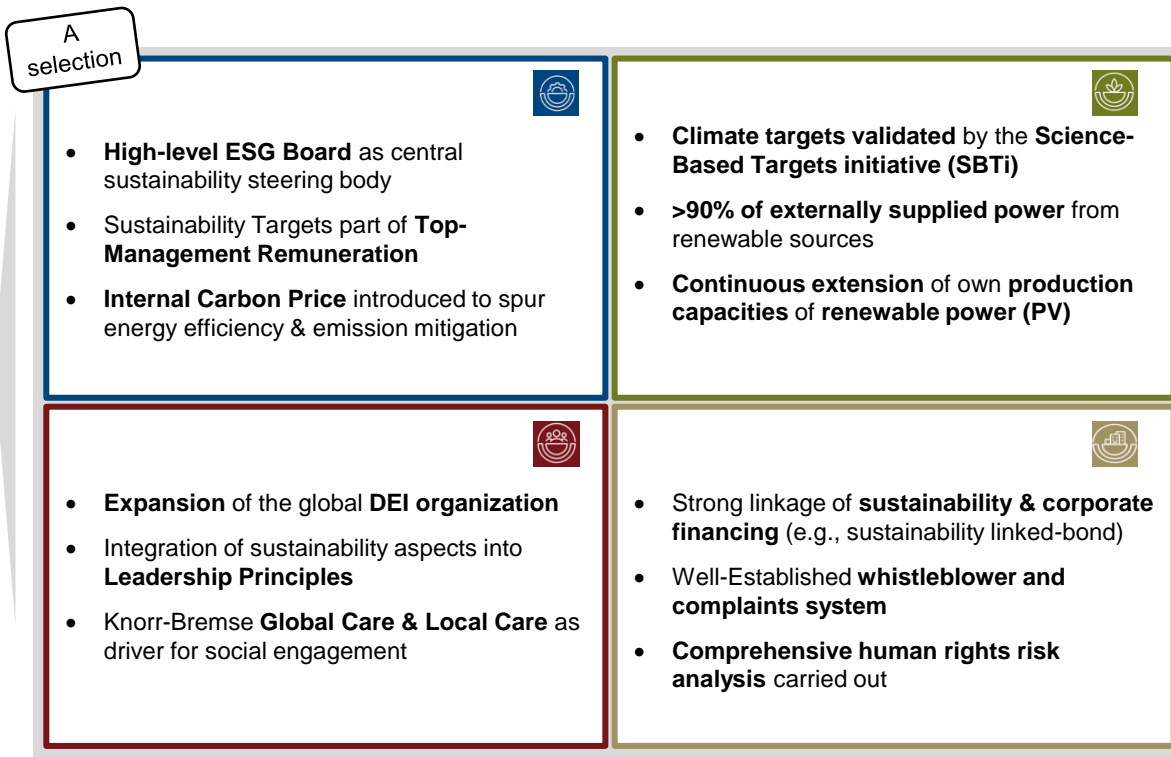
8) Sites covered with an environmental management system (ISO 14001)



9) ESG supplier assessments (in % of total Purchasing Volume)



Integration into our business activities and implementation of the measures



Social commitment on local and global level has a long track-record at Knorr-Bremse – examples from our activities

Knorr-Bremse Local Care

- Local Care organizes and financially supports a broad range of social activities
- Focus: proximity to KB sites
- Supports also corporate volunteering
- **Donations 2022: 2.8 m€**
- **>400 projects in 2022 & >600 employees participated**

Knorr-Bremse Global Care

- Globally active non-profit organization set up by Knorr-Bremse employees
- Focus: targeted long-term project partnerships in the fields of education & WASH (water, sanitation, hygiene) as part of SDGs
- **Donations 2022: ~ 3 m€**

Social Commitment Globally

Education Health Environment Social Cohesion



Example
Cooperation
Safe Hub

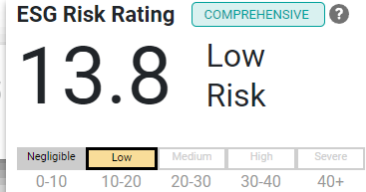


Knorr-Bremse`s Sustainability Management is externally recognized



S&P Global

51



84-92%

For further information please consult Knorr-Bremse sustainability reports



Non-financial declaration 2022

[Link](#)

Sustainability Report 2022

[Link](#)

Agenda

- Introduction
- Key Company Highlights
- Rail Vehicle Systems (RVS)
- Commercial Vehicle Systems (CVS)
- R&D Focus
- Financials
- Sustainability
- **KB shares/ KB bonds**
- Appendix

Share data

Share data

Type of share	Bearer shares with no-par value
Bloomberg ticker	KBX
Reuters ticker	KBX.DE
German security identification number (WKN)	KBX100
ISIN	DE000KBX1006
Shares outstanding as at December 31, 2018	161.200.000

Bond Data

Corporate Bond of Knorr-Bremse AG

Security Identification Number	A2LQP5
International Securities Identification Number	XS1837288494
Issuer	Knorr-Bremse AG
Issuer ratings	A3/outlook stable (Moody's), A-/outlook stable (Standard & Poor's)
Volume	EUR 750 million
Term	7 years
Settlement	June 14, 2018
Maturity	June 13, 2025
Coupon	1.125% p. a.
Reoffer spread	1.188% p. a.
Listing	EURO MTF Luxembourg
Denomination	EUR 1,000
Applicable law	German law

Strong current rating: S&P (A-) and Moody's (A3)

Bond Data

Sustainability-Linked Corporate Bond of Knorr-Bremse AG

Security Identification Number	A30VPQ
International Securities Identification Number	XS2534891978
Issuer	Knorr-Bremse AG
Issuer ratings	A3/outlook stable (Moody's), A-/outlook stable (Standard & Poor's)
Volume	EUR 700 million
Term	5 years
Settlement	September 21, 2022
Maturity	September 21, 2027
Coupon	3.250% p. a.
Reoffer spread	3.331% p. a.
Listing	Regulated Market of the Luxembourg Stock Exchange
Denomination	EUR 100,000
Applicable law	German law

Strong current rating: S&P (A-) and Moody's (A3)

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- **Appendix**

Glossary (1/2)

%	Percentage	CFO	Chief Financial Officer	ELC	Electronic leveling control
ABS	Anti-lock brake system	CKR	Czech Koruna	EOP	End of period
ACC	Adaptive Cruise Control	CNY	Chinese Yuan	ESG	Environment, Social, Governance
AD	Automated Driving	CR	Corporate Responsibility	ESP	Electronic stability program
ADAS	Advanced driver assistance systems	CVS	Commercial Vehicle Systems	EU	Europe, European Union
ADB	Air Disk Brake	D&A	Depreciation & Amortization	EUR	Euro
AEBS	Advanced Emergency Braking System	DE	Germany	FTE	Full-time equivalent
AG	Aktiengesellschaft (German: Stock Corporation)	DEI	Diversity, Equity and Inclusion	GAAP	Generally Accepted Accounting Principles
AM	Aftermarket	DoI	Date of Implementation	GBP	British Pound
BDM	Brake Distance Management	e	Expected	GDP	Gross domestic product
bn	billion	EAC	Electronic Air Control	GSBC	Global Scalable Brake Control
CAGR	Compound Annual Growth Rate	EBIT	Earnings before Interest, Tax	HQ	Headquarters
CAPEX	Capital expense	EBITDA	Earnings before Interest, Tax, Depreciation, Amortization	HSR	High-speed rail
CEO	Chief Executive Officer	EBS	Electronic brake system	HU	Hungary
CF	Cash flow	EGR	Exhaust Gas Reduction	HUF	Hungarian Forint

Glossary (2/2)

HVAC	Heating, ventilation & air conditioning	LDW	Lane Departure Warning	TCO	Total cost of ownership
IAA	International Automobil-Ausstellung (German: International Motor Show)	m	million	TPR	Truck Production Rate
IAM	Independent Aftermarket	M&A	Merger & acquisitions	UIC	International union of railways
iCOM	Intelligent Condition-Oriented Maintenance	OEM, OE	Original equipment manufacturer	US	United States
IFRS	International Financial Reporting Standards	OES	Original equipment service	USD	US Dollars
IN	India	OPEX	Operating expense	WC	Working Capital
IoT	Internet of Things	p.a.	per annum		
IPO	Initial Public Offering	PWM	Private Wealth Management		
JV	Joint venture	R&D	Research & Development		
KB	Knorr-Bremse	ROE	Return on Equity		
KB2020	Knorr-Bremse 2020	ROS	Return on Sales		
KPI	Key Performance Indicator	RVS	Rail Vehicle Systems		
LCC	Life-cycle cost	TCMS	Train Control Management System		

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