

Vale ESG Webinar

Risk Management

Eduardo Bartolomeo
CEO

Carlos Medeiros
Executive Vice President of Safety and Operational Excellence

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De-risking Vale

through Safety and Operational Excellence

De-risking



- Brumadinho
- **Dam safety**
- Robust ESG practices
- Production resumption

Reshaping



- Focus on core business
- Control of cash drains
- Growth opportunities

Re-rating



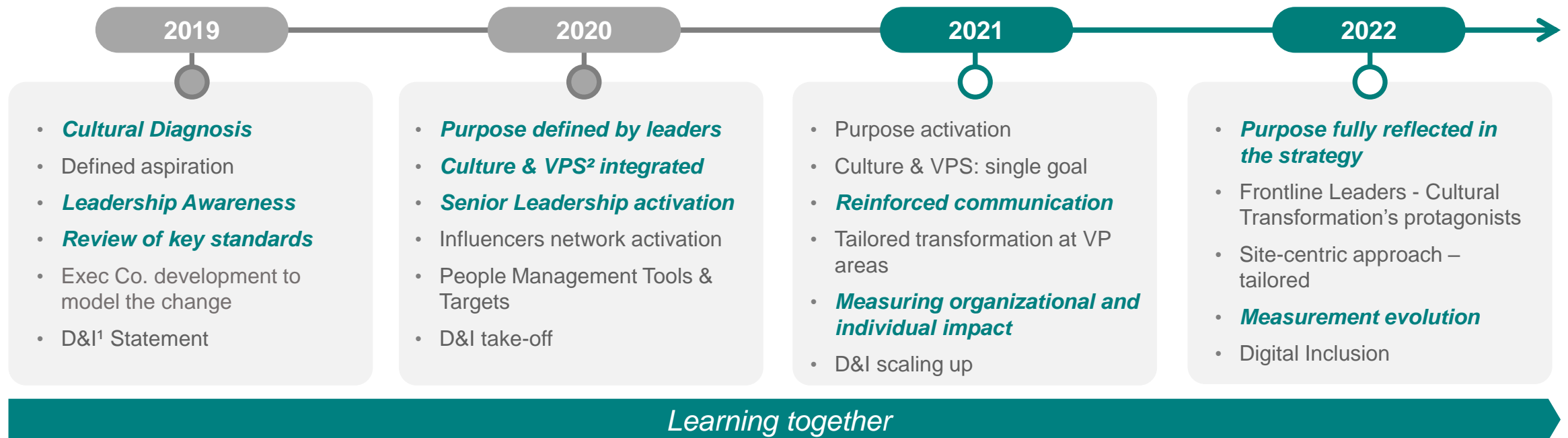
- **Benchmark in Safety**
- **Best-in-class reliable operator**
- Talent-oriented organization
- Leader in low carbon mining
- Reference in value creation and sharing

Solid cash flow generation

Discipline in capital allocation

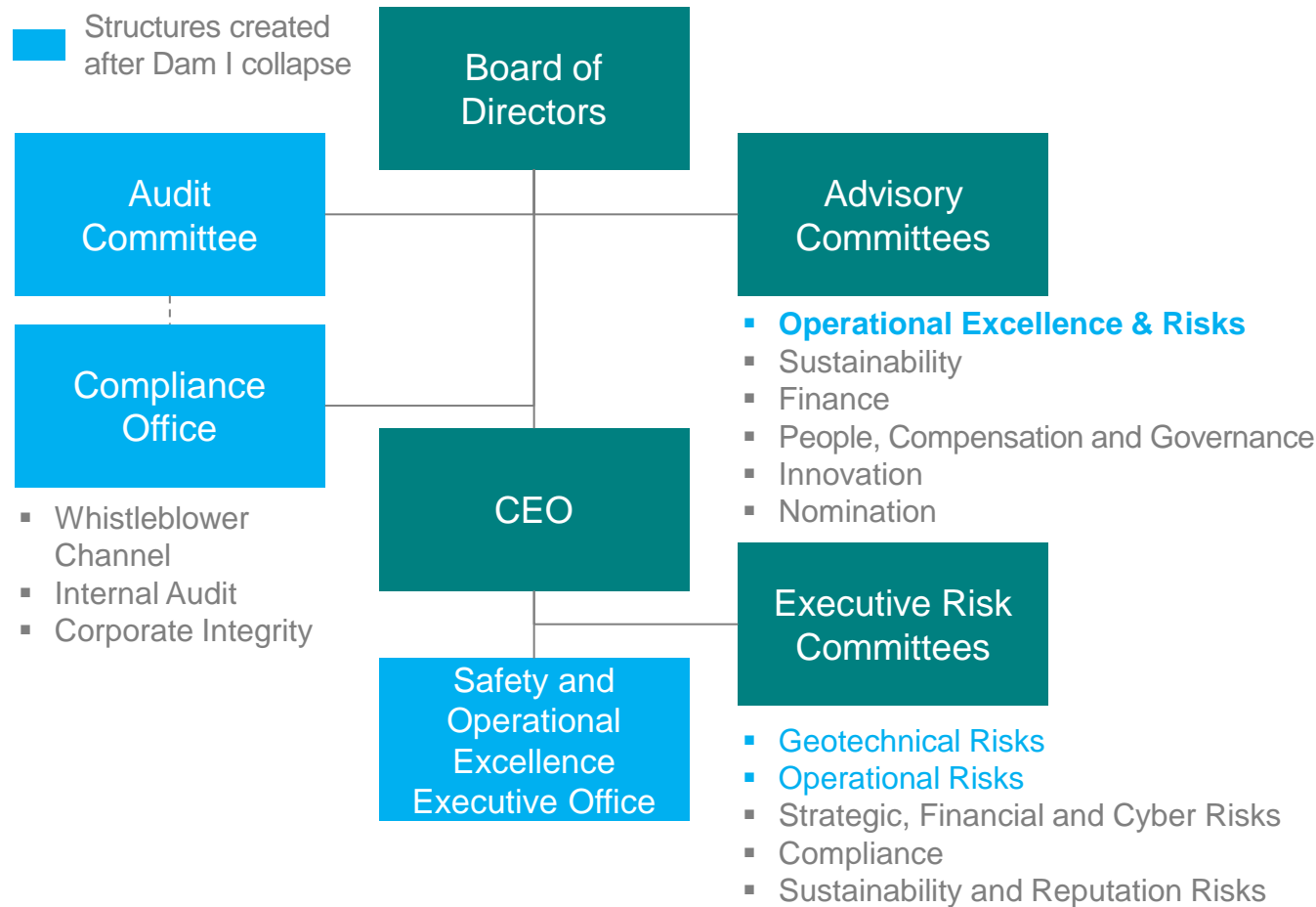
The cultural transformation is keeping pace...

The Pulse:
17,000 employees assessing
key behaviors across Vale



¹ D&I stands for Diversity & Inclusion. ² VPS stands for Vale Production System, Vale's management model.

... supported by a strong governance for safety and risk management



Executive compensation

35-60%

of short-term variable compensation tied to Health & Safety, Operational Risk and VPS targets

The Safety and Operational Excellence Office has **NO TARGET** tied to production or financial metrics



Risk management model

*Carlos Medeiros,
Executive Vice President of Safety and Operational
Excellence*

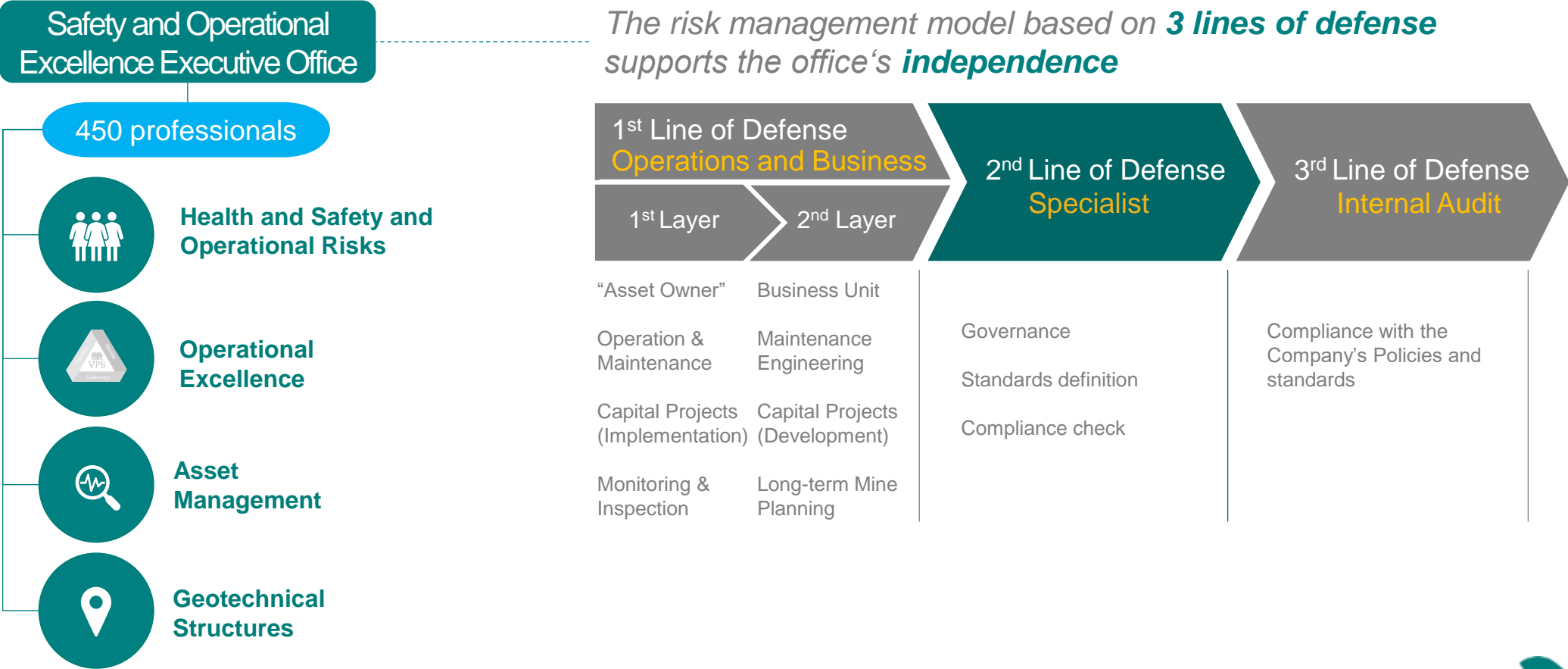
An integrated risk map

supports the decision-making process

Risk categories

Strategic	People	Sustainability and Reputation		Finance	
<ul style="list-style-type: none">▪ Demand and competition▪ Budget and Planning▪ Intellectual property▪ Sales/Commercial▪ Projects and investments▪ Associated companies▪ Merges, acquisitions and divestments▪ Innovation and new technologies	<ul style="list-style-type: none">▪ Outsourcing and partnership▪ Relationship with Unions▪ Organizational structure and culture▪ Abusive and discriminatory practices▪ Training, recruitment and retention▪ Staff dependency / successions▪ Adherence to Labor Law	<ul style="list-style-type: none">▪ Reparation▪ Climate Change▪ Waste, effluents and emissions▪ Socio-Environmental obligations▪ Human Rights▪ Relationship with communities▪ Institutional relationship▪ Disruptions, vandalism and terrorism▪ Image and reputation▪ Communication and disclosure	<ul style="list-style-type: none">▪ Exchange and interest rates▪ Commodities▪ Freight▪ Investor Relations▪ Cash flow▪ Capital availability▪ Insurance coverage▪ Credit granting and defaults▪ Financial and accounting reports▪ Compliance, fraud		
Operational	Geotechnical	Business Continuity		Compliance	Cybernetic
<ul style="list-style-type: none">▪ Occupational Safety▪ Occupational Health & Hygiene▪ Compliance with H&S Norms▪ Process Safety▪ Production disruption / material losses	<ul style="list-style-type: none">▪ Tailings dams▪ Pile▪ Embankments, cuts and slopes▪ Underground mines	<ul style="list-style-type: none">▪ Shortage of critical raw materials▪ Water and energy availability▪ Licenses, concessions and mining rights▪ Mine, rail, road and port structure▪ Shipping and inland waterway▪ Waste and tailings disposal▪ Availability and quality of mineral reserves	<ul style="list-style-type: none">▪ Anti-corruption▪ Tax and Fiscal▪ Sanctions▪ Antitrust▪ Data Protection▪ Litigation▪ Regulatory changes	<ul style="list-style-type: none">▪ Information theft or leakage▪ Unavailability of technology assets▪ Loss of data integrity	

The Safety and Operational Excellence Executive Office was created in 2019...



... to ensure an effective risk management

Office's reporting routine

Half-year reports

to the Board of Directors

Half-year reports

to the Fiscal Council

Monthly reports¹

*to the Operational Excellence and Risk Committee,
which reports monthly to the Board of Directors*

Weekly reports

to the Executive Board

Ad-hoc reports

*whenever a risk out of the tolerable
limit is identified*

Operations shutdown² as a result of more stringent Health & Safety protocols

- Operations at Sossego
- Operations at Onça Puma
- Operations at Voisey's Bay
- VNC Refinery
- Simões Filho Plant
- Mina Azul
- Project Salobo III
- Project VBME
- Port Colborne Refinery

Non-exhaustive list

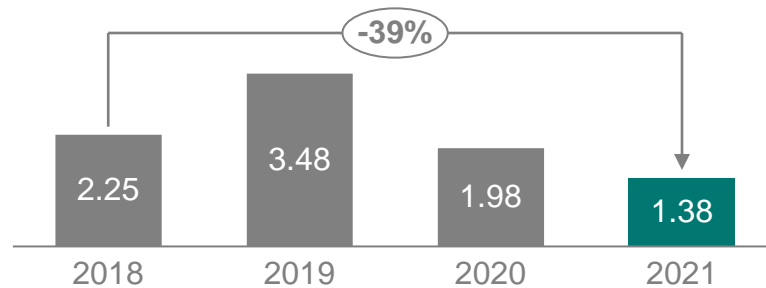
¹Considers 26 thematic reports in 9 months within a year. ²In 2020, temporary or definitive shutdown.

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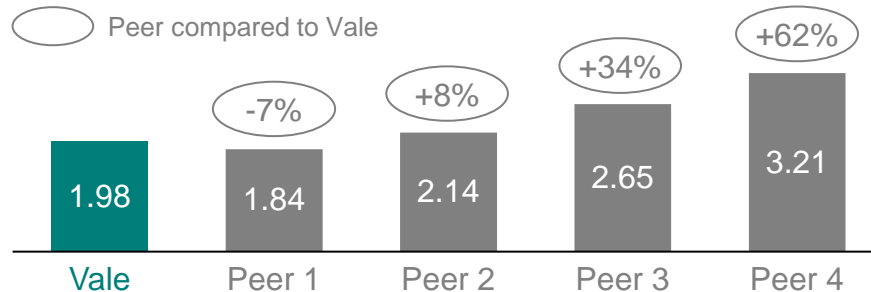
Occupational Health & Safety

We are building a sustainable performance in Health & Safety ...

TRIFR¹



TRIFR - 2020 comparison in mining



Innovation to reduce risk exposure

- **Digital workforce:**
Eliminating at-site risks by accelerating remote working
- **Automation:**
 - Brucutu mine's entire fleet is autonomous
 - Remotely controlled equipment for decharacterization of critical dams
 - Unmanned train operation at Timbopeba site



¹ Total Recordable Injury Frequency Rate.

... as we are **making progress**
with our commitments



Zero high-potential recordable injuries (N2)¹

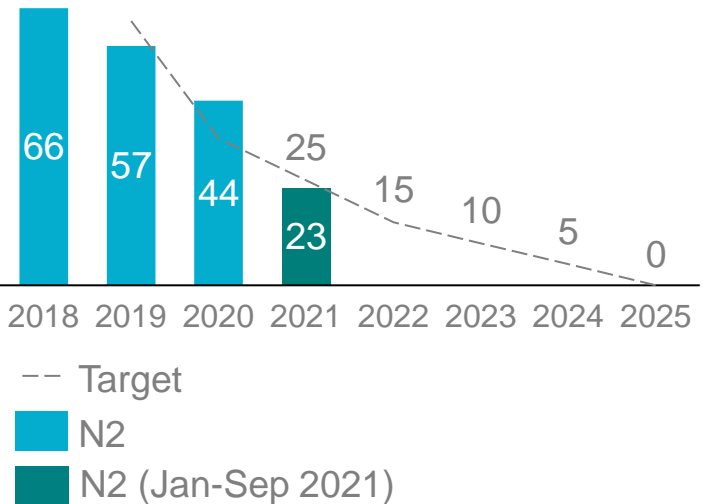


Reduce by 50% employee exposure to key health risks²

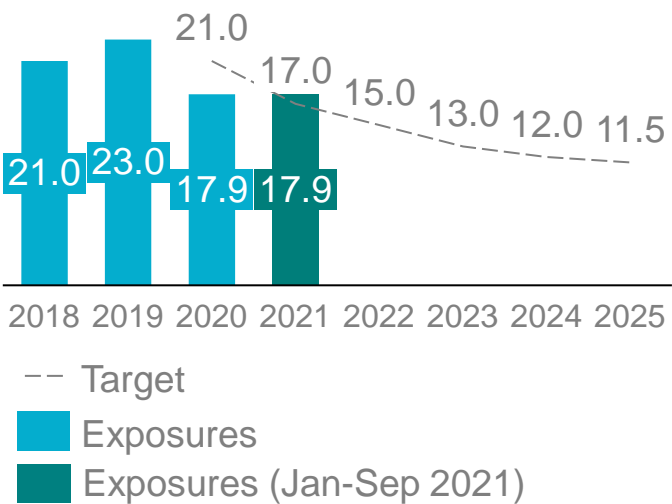


Eliminate very high-risk scenarios³

Reduction of high-potential recordable injuries (N2 - absolute values⁴)



Reduction of exposures above the Occupational Exposure Limit (OEL)



Note: Commitments by 2025.

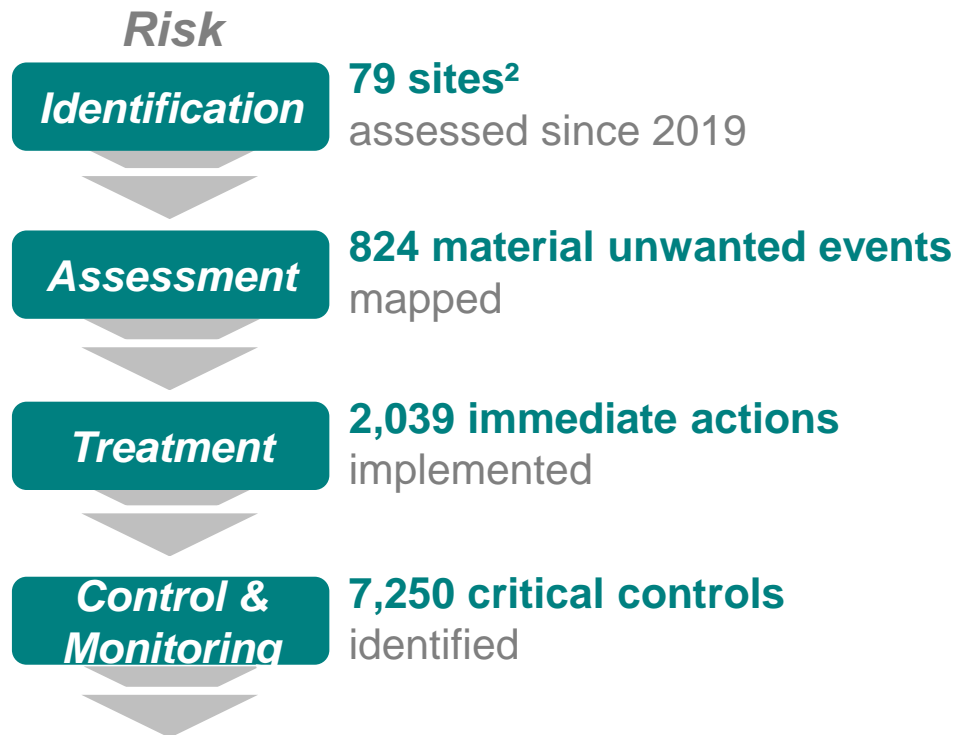
¹ Injuries which are considered a precursor to fatal accidents. ² Physical, chemical or biological risks. ³ According to Vale's risk matrix, based on 2019. ⁴ Includes own employees and third parties.



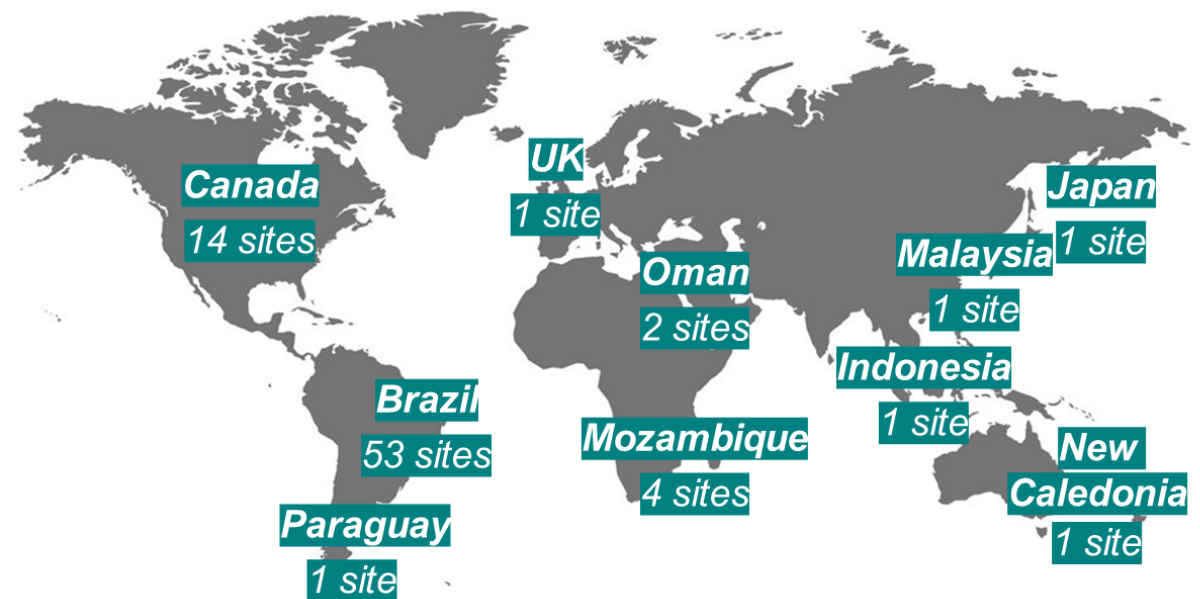
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HIRA implementation

All sites are already covered by HIRA¹ first cycle...



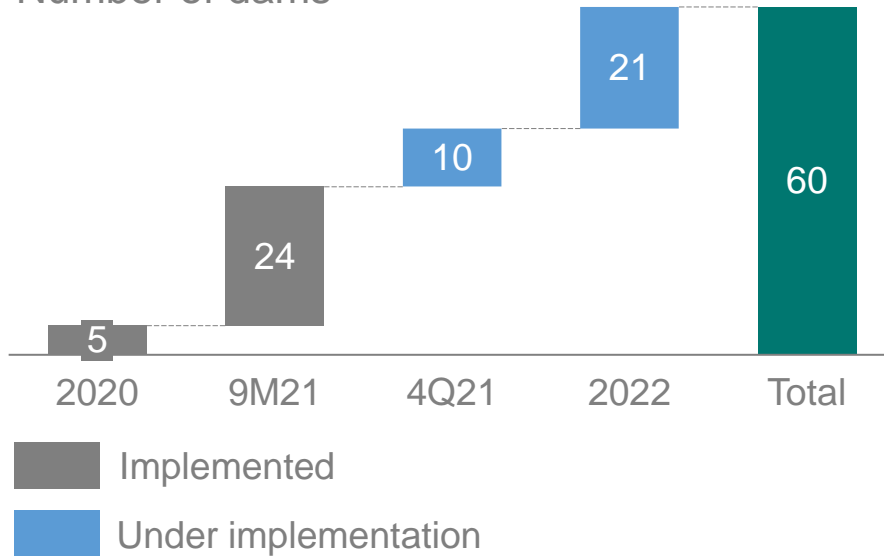
*Reassessments every 3 years (critical sites)
or 5 years (non-critical sites)*



... with rollout to our dam portfolio

HIRA for Dams and Tailings Storage Facilities

Number of dams



- Focus on **key tailings dams**¹ operated by Vale
- Assess **Material Unwanted Events**
- Identify, design and implement **Critical Controls**
- Prioritize and implement **Immediate Actions** for risk reduction
- Supported by external expert companies

¹ Includes facilities within Vale operations and excludes Non-operated Joint Ventures (JVs). Key tailings storage facilities based on the definition agreed by the International Council on Mining and Metals Tailings Advisory Group in response to the Church of England information request, which may differ from Brazilian National Mining Agency definition.

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Operational Excellence

The VPS¹ is the vehicle of our cultural transformation...



**3 dimensions,
17 elements**
with the minimum
compliance requirements

Structuring

- ✓ Simplification of the management model
- ✓ Publication of the VPS Manual and Rulers
- ✓ Structuring performance cycles
- ✓ Training of employees in VPS

2019-2020

Back to basics

- 5S, routine management
- Technical capacitation
- Maintenance strategy
- Structuring maintenance plans and control
- Basic guidelines (maintenance, operation, geotechnical)
- VPS Assessment

2021-2022

Continuous improvement and operational stability

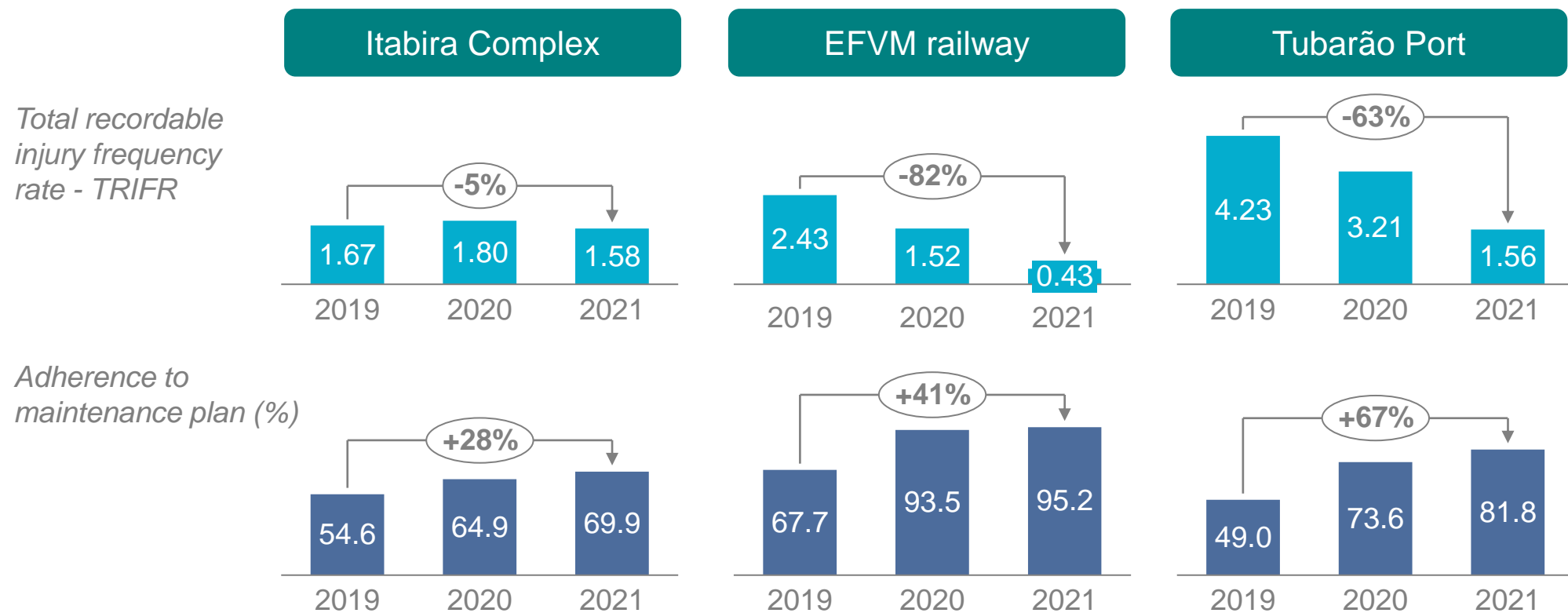
- Standardization of priority tasks
- MICT² technical training
- Waste reduction and increased productivity
- Problem exposure culture and continuous improvement
- Consolidation of maintenance and operation processes

2023-2025



¹Vale's integrated management system. The acronym stands for "Vale Production System". ²Vale's integrated MICT stands for Integrated Model of Technical Training.

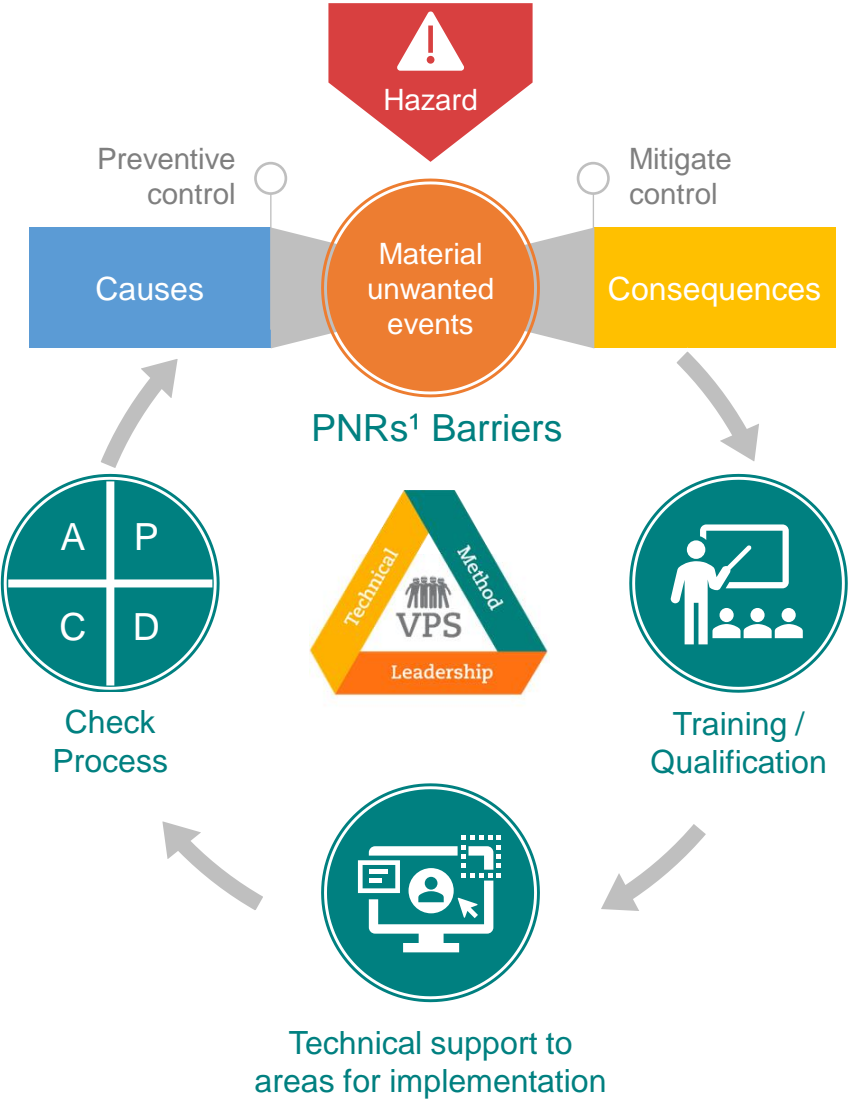
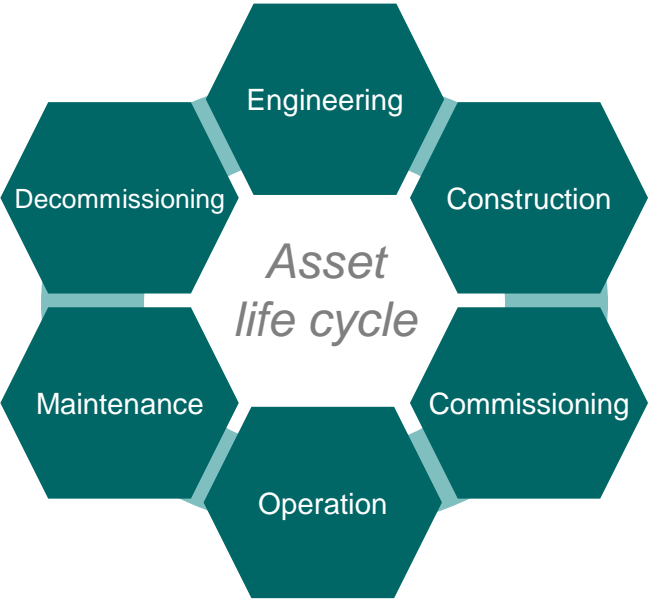
... and drives Vale to become the best-in-class reliable operator



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Asset Integrity

We promote the Safety and Integrity of our assets throughout their life cycle



¹ Normative standards.

Our Asset Integrity technical standards are global for critical assets

~50%

of standards defined by the end of 2021

- Risk assessment
- Benchmarks
- International standards
- Best engineering practices
- Accident history
- Engineering companies

+17,000

employees trained in Asset Integrity standards

Systems, layout and structures	Rail Ports and bridges Pumping systems Hazardous material handling Explosives Combustible dusts and solids Plant layout, escape route
Fire Protection & Fighting	Protection and firefighting systems Detection and alarm systems
Equipment	Material handling systems Structural integrity Furnaces, reactors, off-gas systems
Electrical, Automation, Instrumentation	Instrumentation and control Incident energy Power station protection systems

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Dam management

Progress with TDMS and the Decharacterization Program

Tailings & Dams Management System

Routine

- New dam management policy
- Responsibility assignment matrix revised
- 25 requirements and guidelines
- Periodic assessment by the assurance team

Performance

- 100% of dams¹ with Engineer of Record
- Continuous monitoring and inspections
- Periodic and immediate reports to upper management

Risk assessment

- 100% tailings dam portfolio covered by risk assessment (HIRA) by the end of 2022
- Rigorous enforcement of updated emergency level requirements

Upstream² Dam³ Decharacterization Program

- **6 upstream dam eliminated since 2019**
- 24 upstream dam to eliminate:

Emergency level	# of dams
3	3
2	4
1	4

- Back-up dams for all level-3 dams
- No dam at emergency level 3 by 2025
- Program's completion by 2029



¹In Brazil. ²Same raising method deployed at B1 dam, collapsed in Brumadinho. ³Includes dams, dikes and waste piles.

Commitment to comply with the GISTM

Tailings storage facilities (TSF) operated by Vale will be in conformance with the GISTM:

- Those with “Extreme” or “Very high” potential consequences, by August 5th, 2023
- All other, not in a state of safe closure, by August 5th, 2025

1st step – Self-Assessment

By the 1st Line of Defense

Completion by October 2021

A form-based tool for the assessment of each TSF (with supporting evidence). Cover all 77 auditable requirements.

2nd step – Gap Assessment

By 2nd Line + external consulting

Completion by February 2022

Re-assessment of select TSFs for full compliance

Key findings in December 2021

3rd step – External Audit

By independent, external party

Deadline for completion to be defined

Depending on further guidance by the ICMM



*Decharacterization of
8B dam*
Nova Lima (MG)

2019



*Decharacterization of
Dique Rio do Peixe
Itabira(MG)*



***Decharacterization of
Fernadinho dam***
Vargem Grande Complex (MG)



**Sul Superior
back-up dam**
Barão de Cocais, MG, Brazil



***Forquilhas and Grupo
back-up dam***
Ouro Preto and Itabirito (MG)



B3/B4
back-up dam
Nova Lima (MG)

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Closing remarks

**We are building
a safer and more reliable Vale**



Geotechnical Monitoring Center
Parauapebas (PA)

