

Vale Sand

ESG FEASIBLE

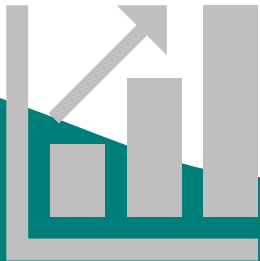


How is Vale reinventing itself and transforming its iron ore tailings into new products?



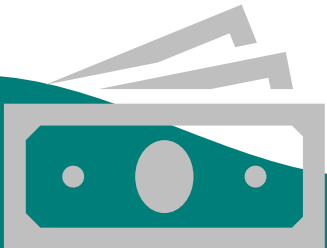
Businesses are starting to see some results from environmental, social and governance investments

“Creating a circular economy is the business opportunity of our time” (CEO Holcim, 2022)



59%

Positive impact on company's revenue growth



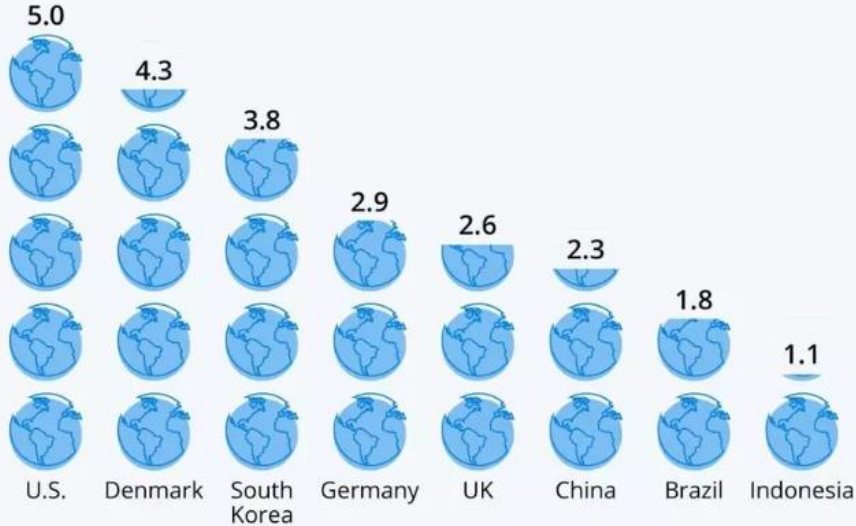
51%

Positive impact on company's profitability

Source: Delloite, 2020

The World Is Not Enough

Number of earths/its resources needed if the world's population lived like the following countries



Selected countries. Calculated based on 2021 Earth Overshoot Days/2017 data
Source: Global Footprint Network



Vale has the aim to transform itself into a more sustainable mining



Iron Ore Tailings Volume

Vale produces about 40 MTPA of iron ore tailings, 20% of them are ultrafine tailings and 80% are coarse tailing



The world is running out of sand

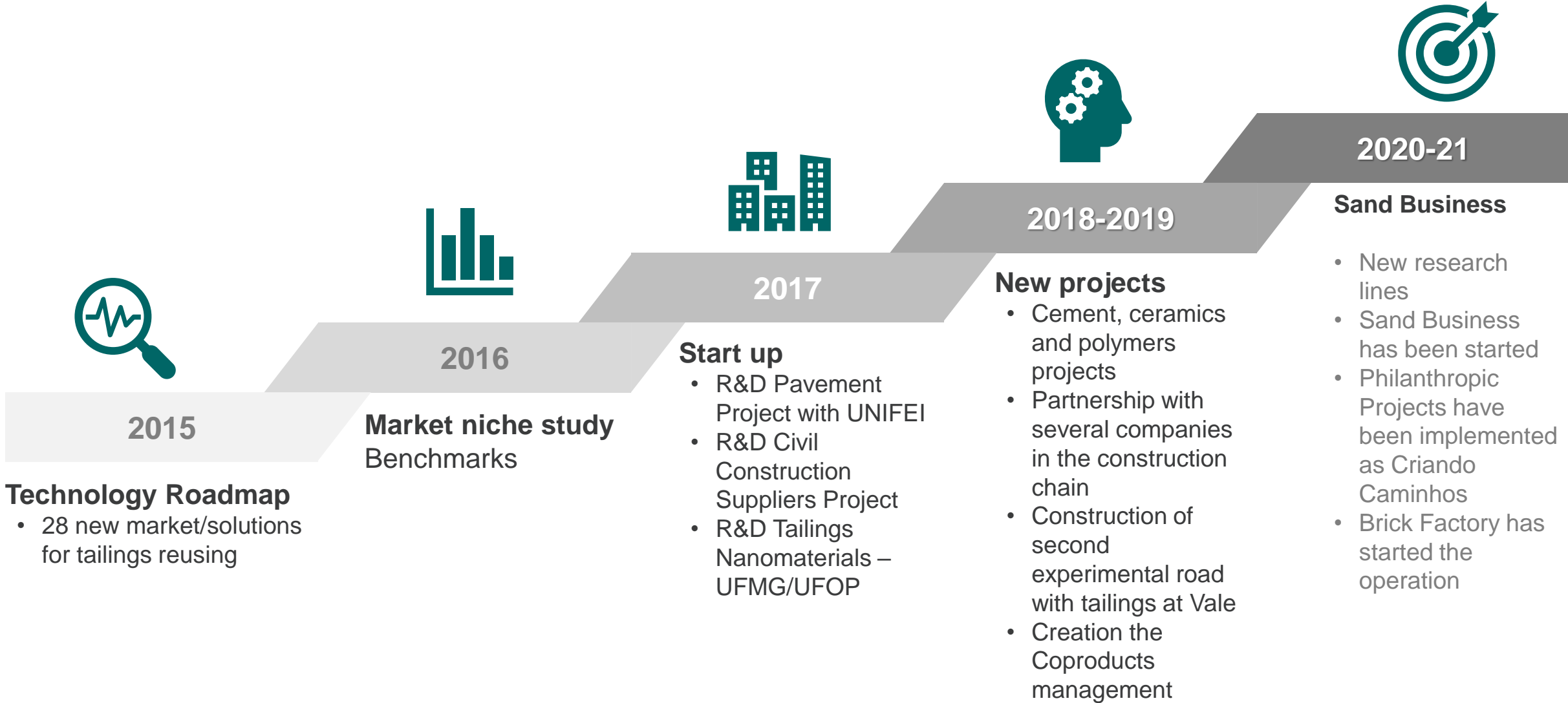
- Sand is the second most consumed natural resource in the world (UNEP)
- Worldwide sand extraction rates are exceeding natural replacement rates (WWF)



Interesting changing of customer's behaviors

“Consumers are voting with their dollars — against unsustainable brands”. 66% of Brazilian customers are more open to buy sustainable products (Nielsen, 2019)

Since 2015, Vale is researching new opportunities to transform iron ore tailings into new products and new business. Vale has created an open innovative ecosystem with more than 30 universities, research centers and other companies

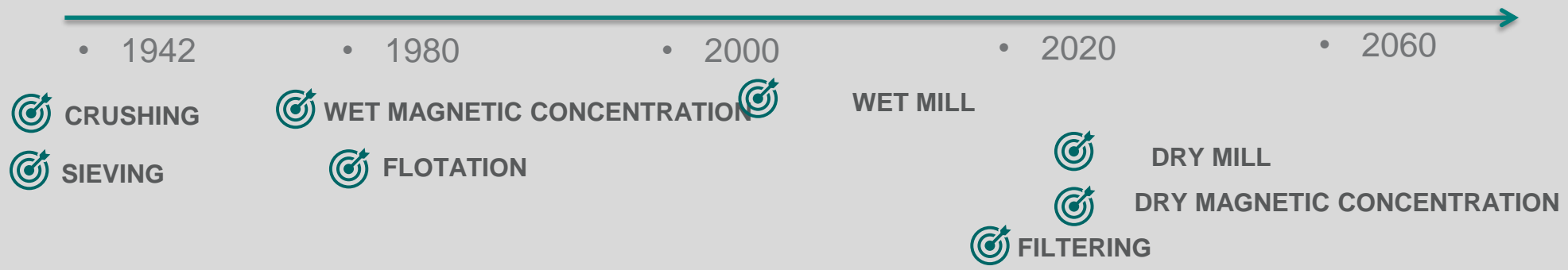
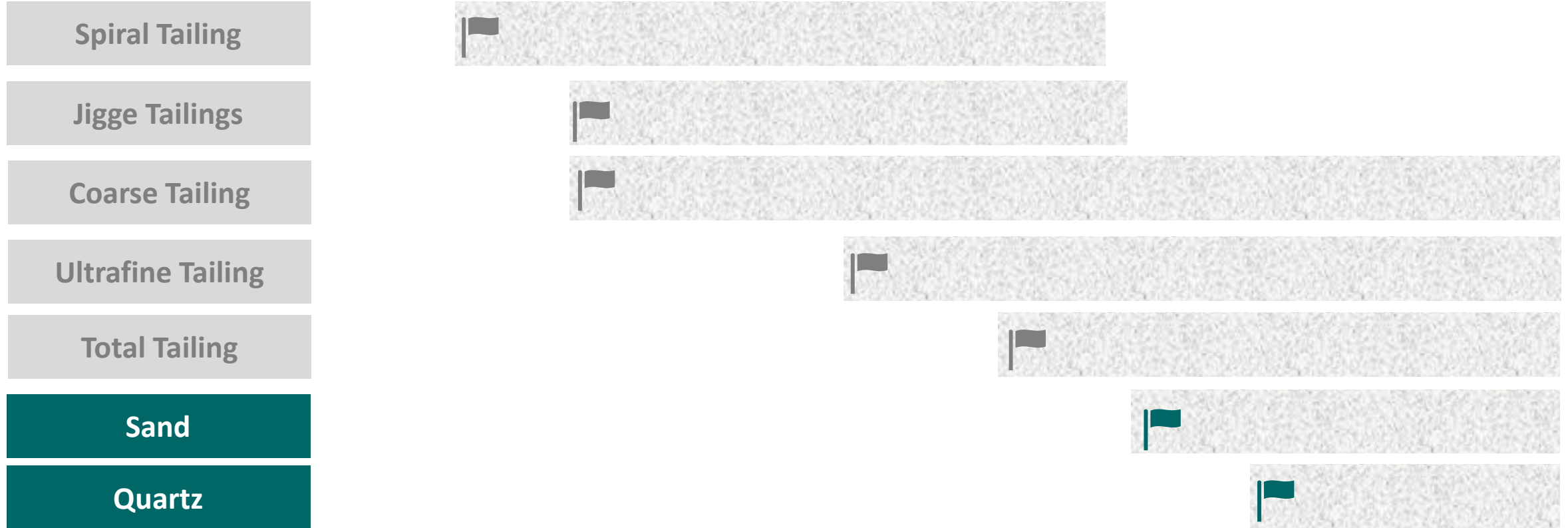
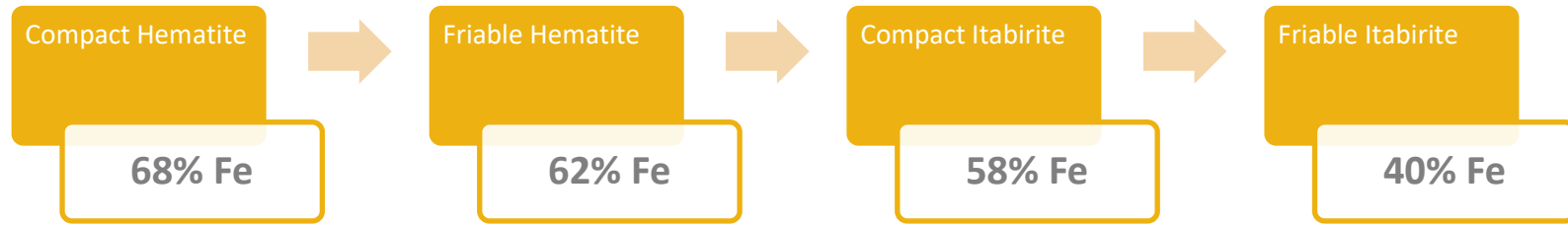


The customers
want a product,
not a waste



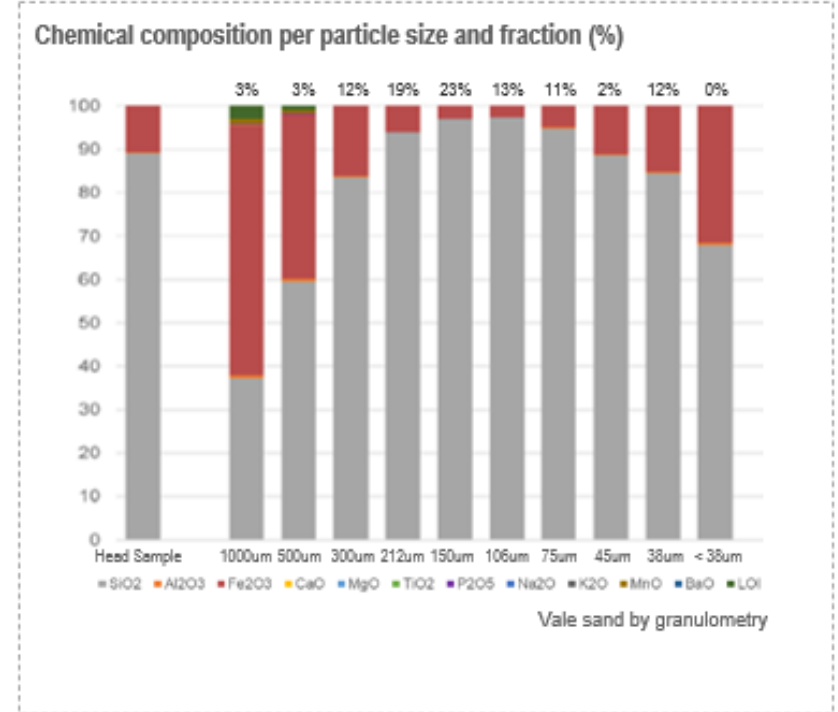
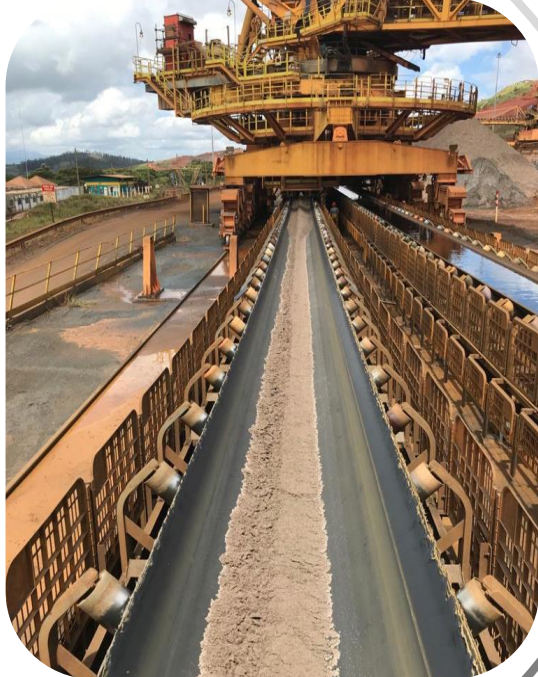
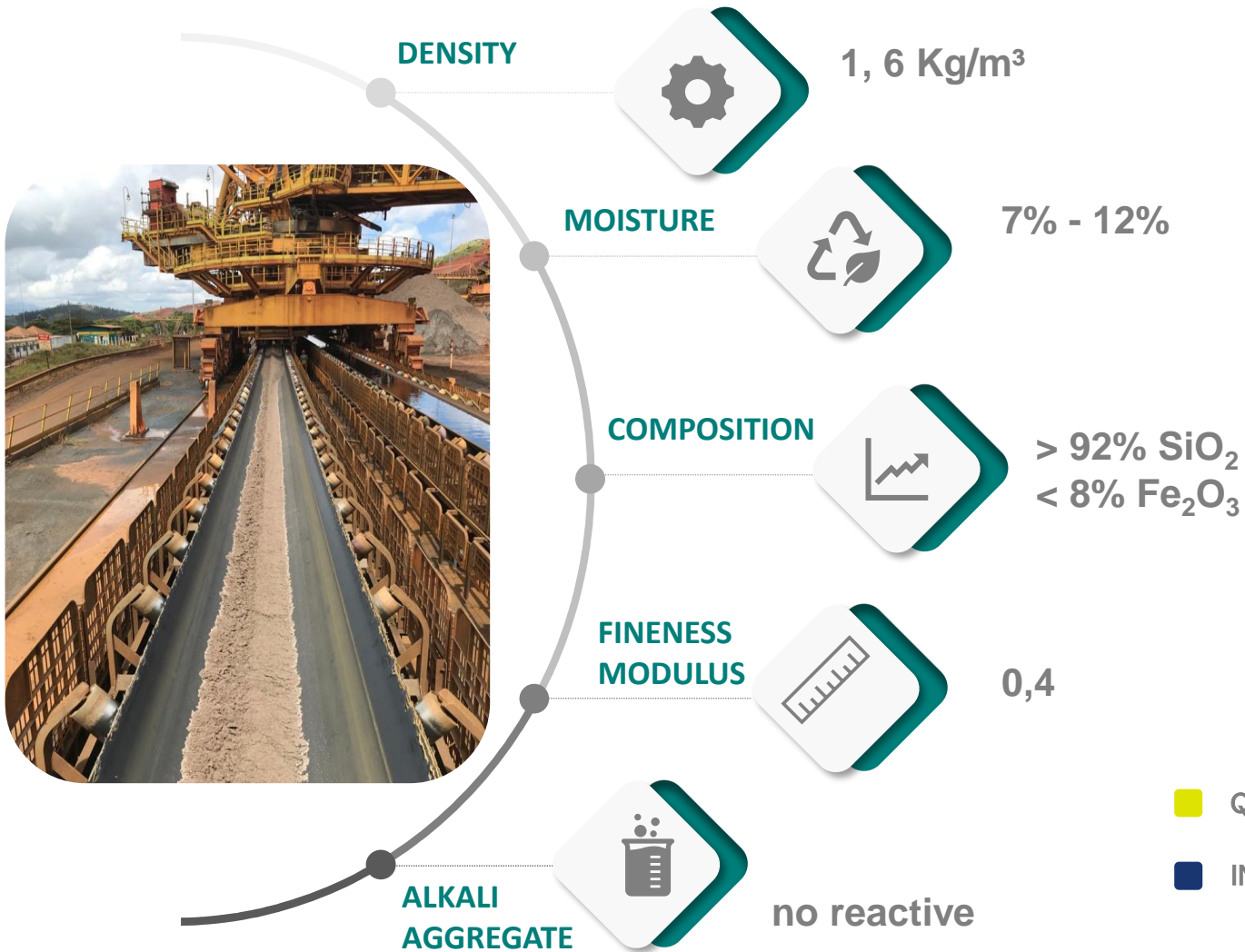
[Watch 'Vale Produção de Areia EN' | Microsoft Stream](#)

Vale Hystorical

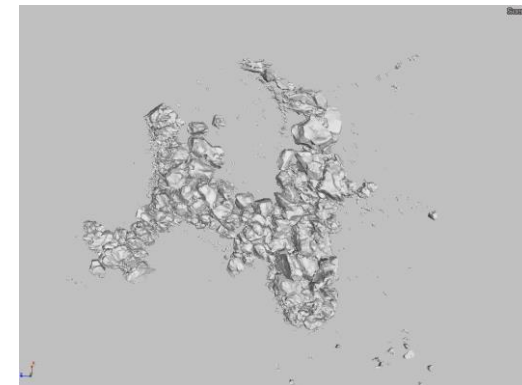


Fonte: Dutra, Resende e Malheiros, 2019

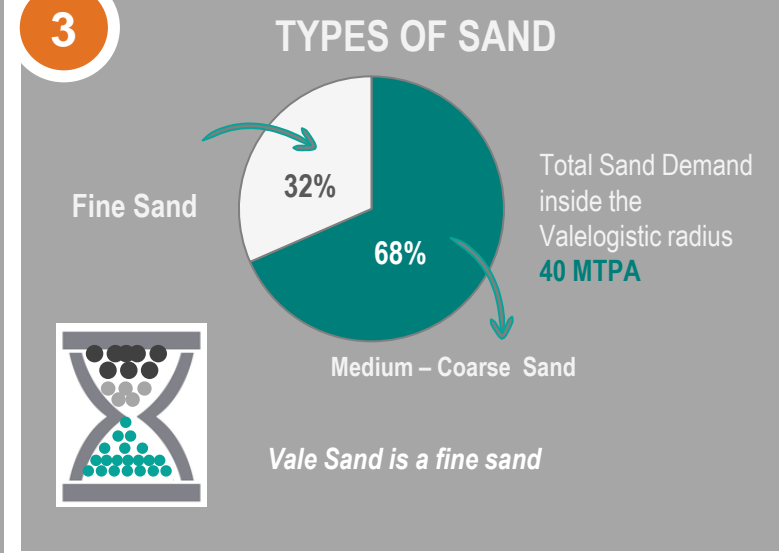
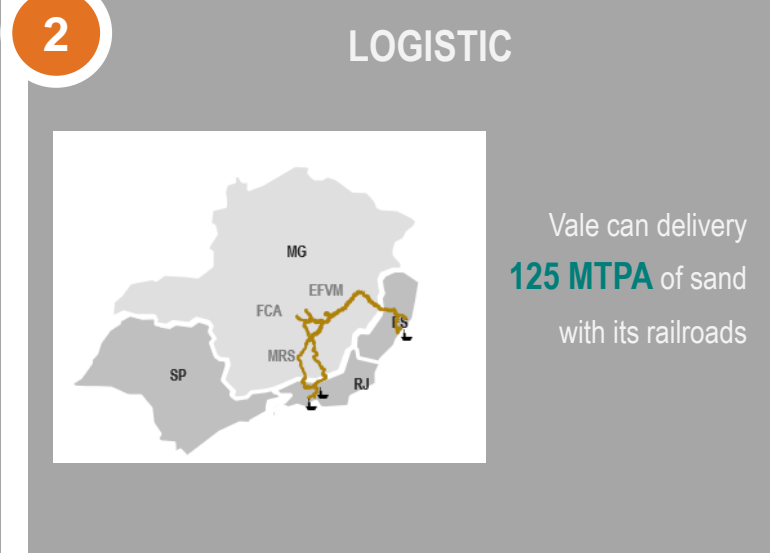
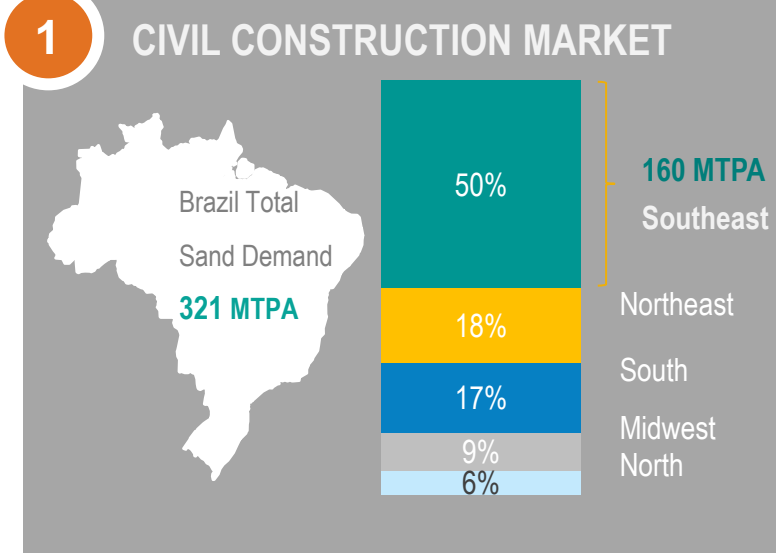
Our sand is produced by adding concentration and filtering processes to our iron ore production sites in order to improve the quality and stability of our product



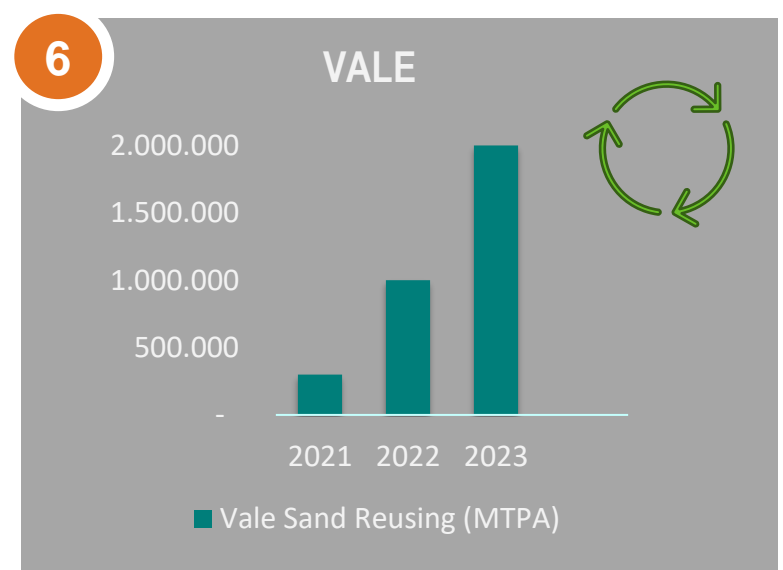
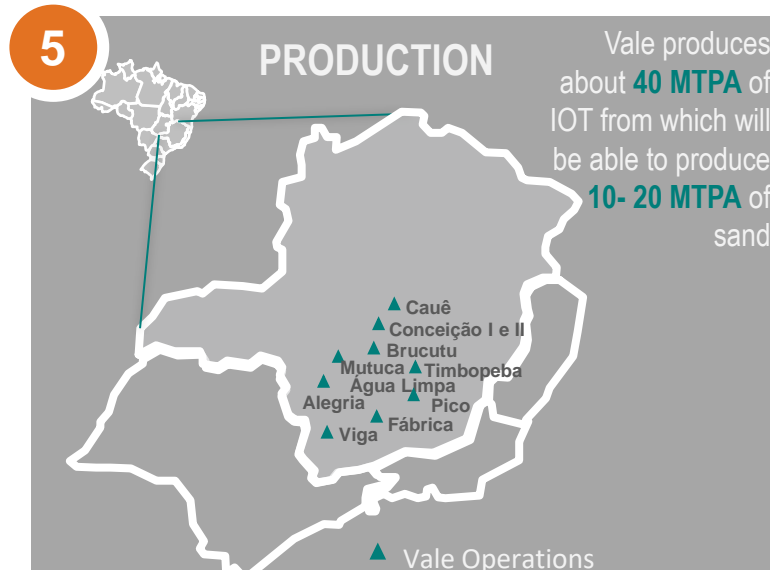
- QUARTZ
- IMPURITIES



Vale is already selling, donating and reusing its iron tailings. Until 2023, Vale is going to reuse over 2,0 MTPA of its sustainable sand



- ### 4 MARKET CHARACTERISTICS
- > 27.000 clients
 - > 1781 cities
 - Technical sale
 - Low value product (~R\$ 45,00/t)





**MINING,
ENVIRONMENTAL,
TAX LEGISLATION**



**GREEN
INTERNACIONAL
VALIDATION**



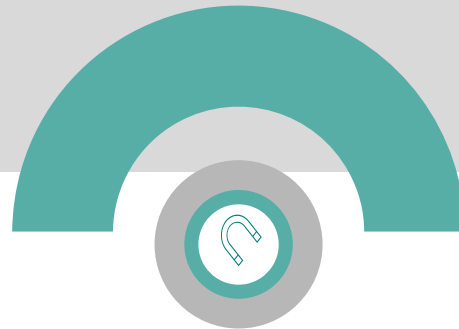
**MARKET RELIABILITY
(NPS)**



It was a not an easy journey. We had to be resilient and to make a huge transformation inside the company...



RESEARCH



ADAPTING THE PROCESSING



ECONOMIC MARGIN



**CHANGE OF THE ORGANIZATION'S
MINDSET**



Pico Brick Factory is Vale's first iron tailing reuse initiative

ESG FEASIBLE



VALE + CEFET



Minas Gerais/Brazil



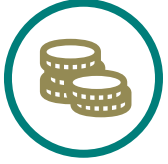
Reuse up to 30 kt/year



Capacity: 3,8 MM units/year



Whole production for communities and internal consumption



Investment: US\$ 6,00 MM



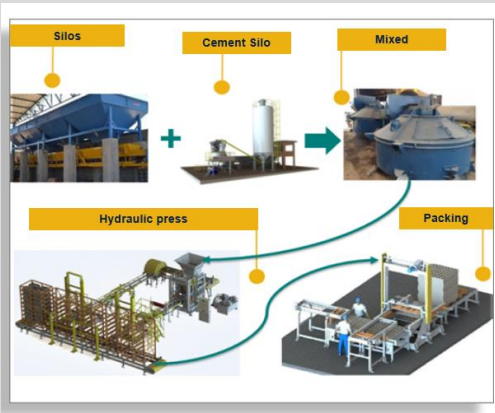
All operators are women



The technology transferring is in real time



The operation system is fully automatic, and it uses 5 stages



Coarse iron tailing replaces 100% of fine aggregate



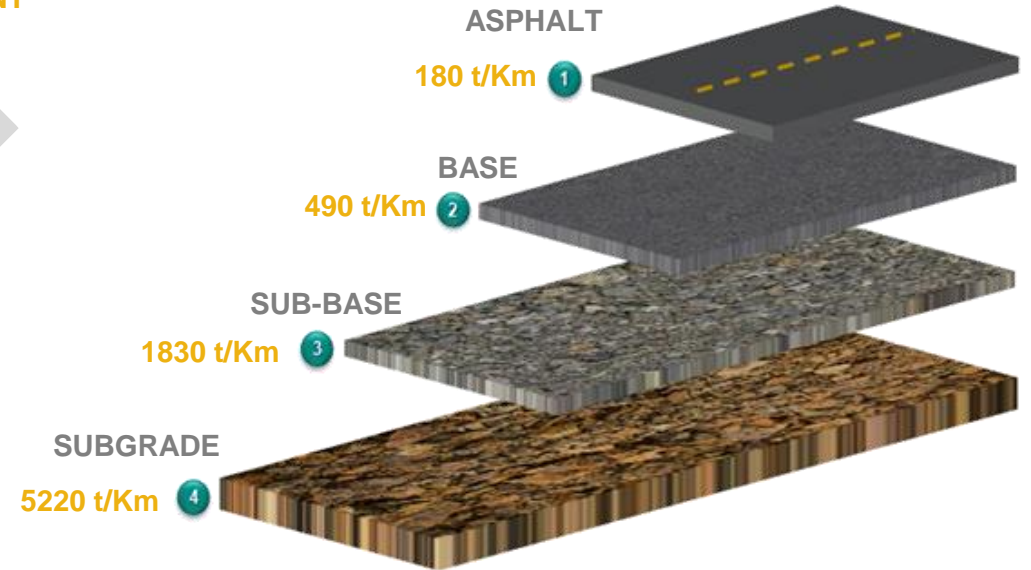
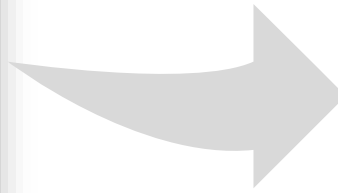
Since 2017, Vale and UNIFEI have been researching the potential of iron ore tailings for different types of pavement (road, countryside and rail)

First Experimental Road

- Experimental road with 96 sensors which have used Vale Sand in all layers
- USD 1,6 MM invested



ROAD PAVEMENT

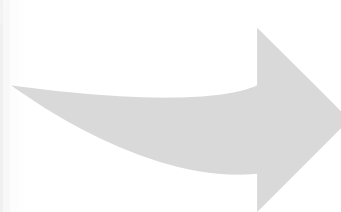


19 Km of Concrete Pavement

- 150 Kt of sand reusing
- Important partnership between Vale, Builders Company and Brazilian Government



CRIANDO CAMINHOS PAVEMENT



Social Tailings Program

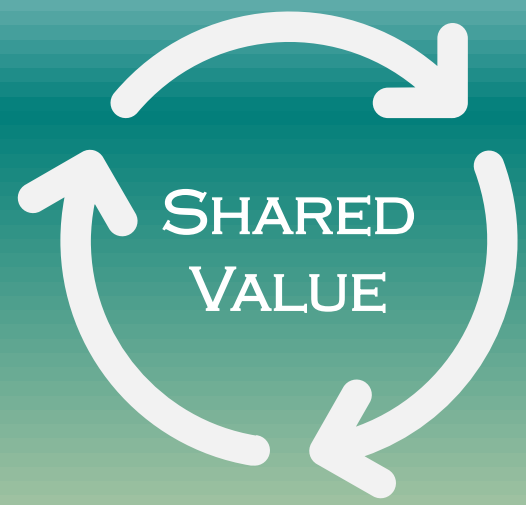
- Criando Caminhos tested 3 sustainable solution for countryside pavement
- Partnership with UNIFEI + Cities Hall
- + 30 Kt sand reusing



UNIFEI, UFRJ , DNIT



Iron Ore Tailings



Quartz / Sand



*Sustainable
Development*

CONFIDENCE ECOSYSTEM WHICH EVERYBODY WINS



RESERACH CENTERS



INDUSTRY



INVESTORS



SOCIETY

Muchas Gracias



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