

Disruptive Innovation in Tailings for Sustainable Mining | Alta Ley-ICMM webinar, 8 August 2025

OreSand

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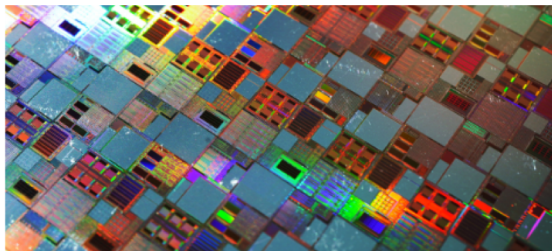
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The minerals world is already undergoing disruption

50 billion tonnes per year of waste rock and mine tailings needs solutions additional to waste repurposing...



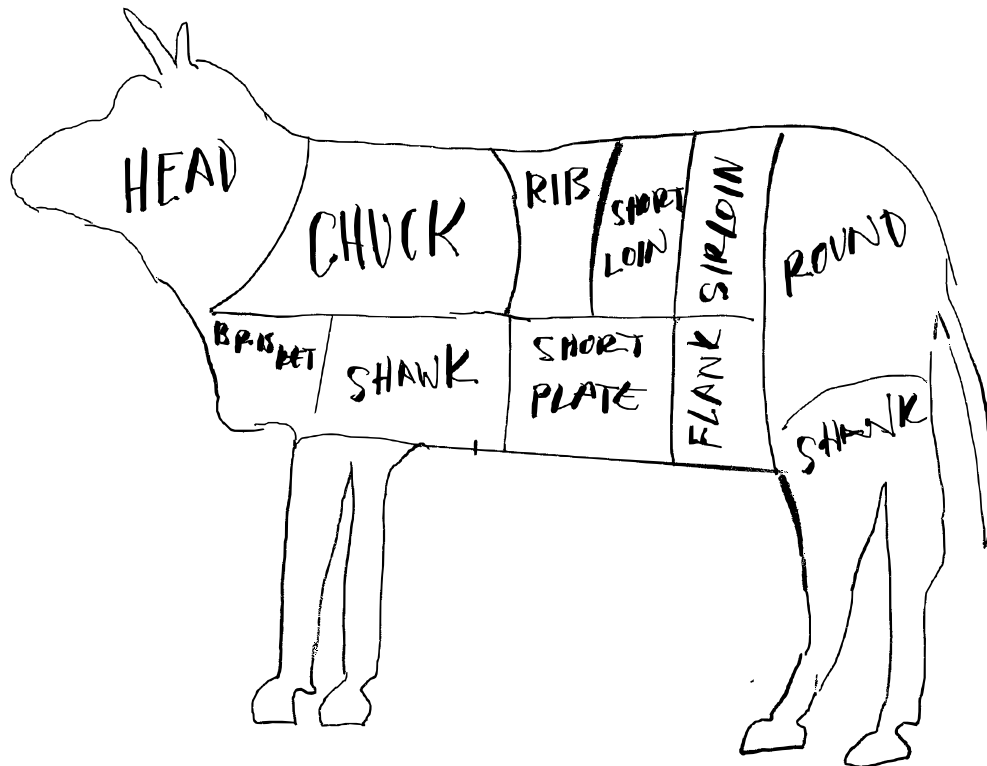
...as we face growing demand in a strained minerals supply model



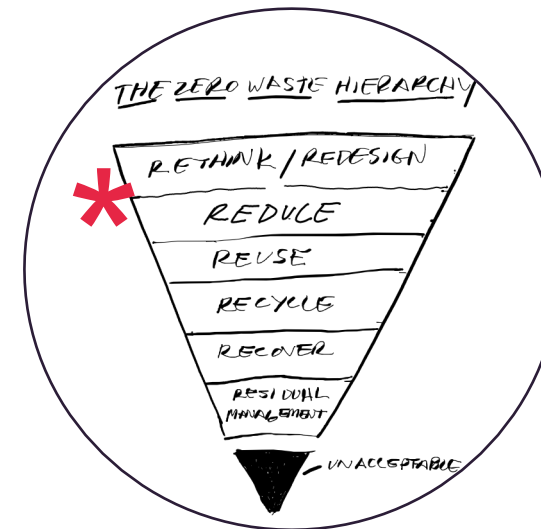
A creative disruption in the making : Nose-to-tail mining

"Under our current models, companies are like butchers extracting just the prime cuts of meat and leaving the rest to go to waste. We think it's time to make sausages." —

Prof Daniel Franks, Director, Global Centre for Mineral Security



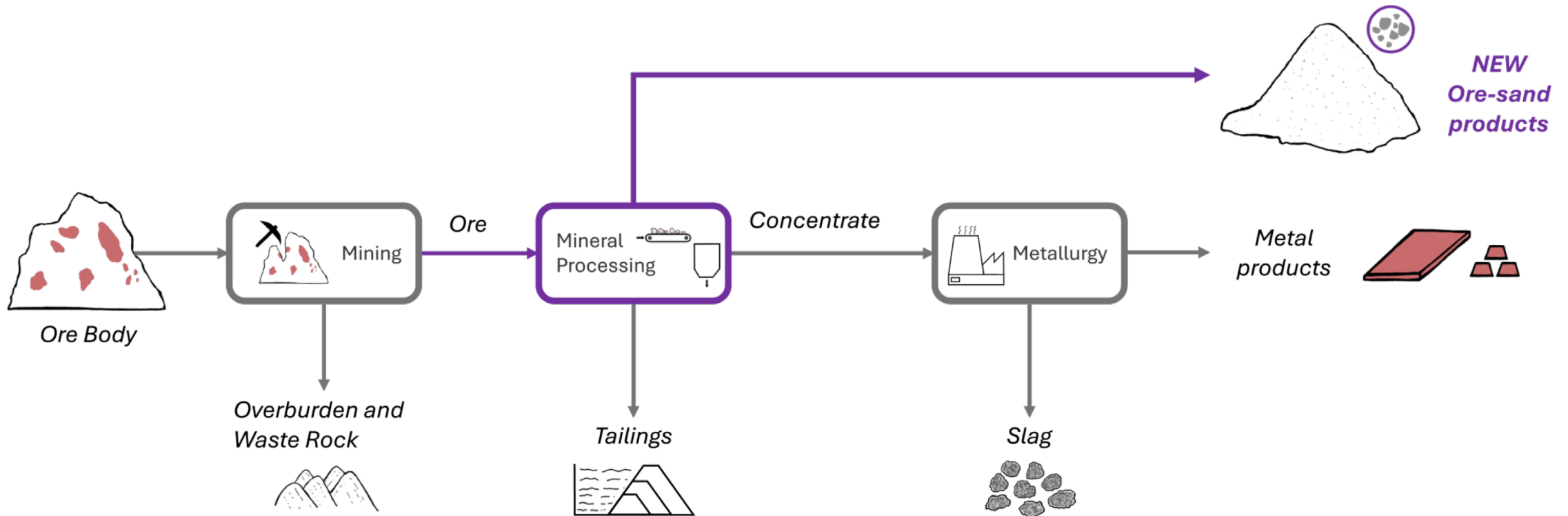
This is a large-scale circular economy strategy
for the mining sector already underway as
OreSand



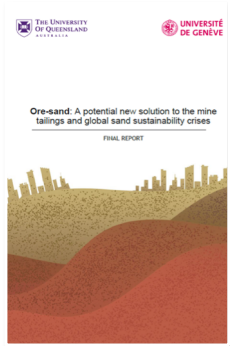
What is OreSand?

OreSand is a form of sand manufactured as a by-product or co-product from primary ore processing

OreSand is not tailings. It comes from the ore, not from the waste.



Case 1



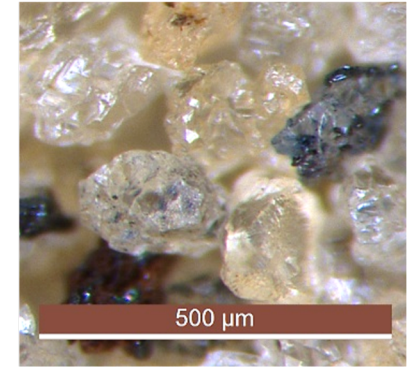
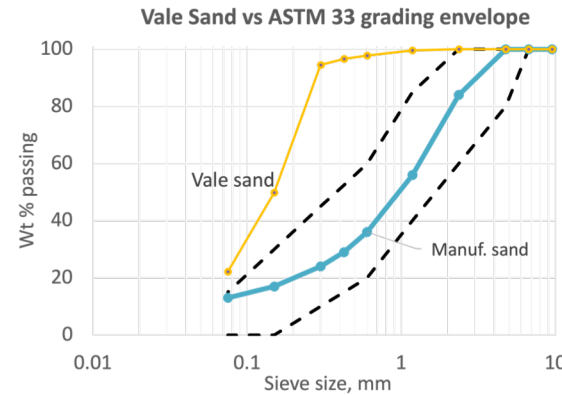
Demonstrates feasibility and and low-carbon potential of sand co-production

Golev et al. (2022)
https://smi.uq.edu.au/files/83107/FinalReport_OreSand_v1.pdf

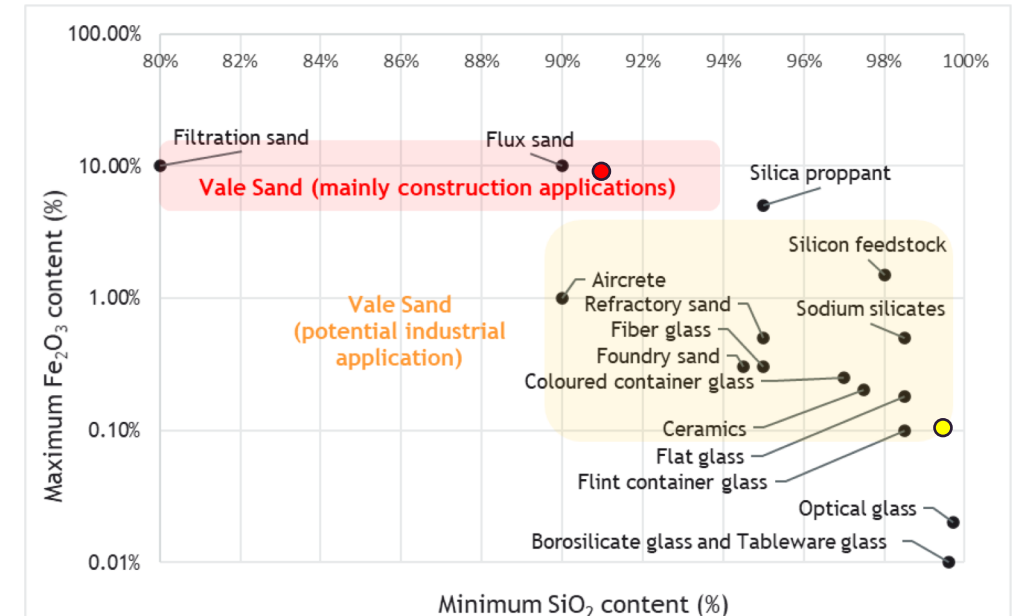
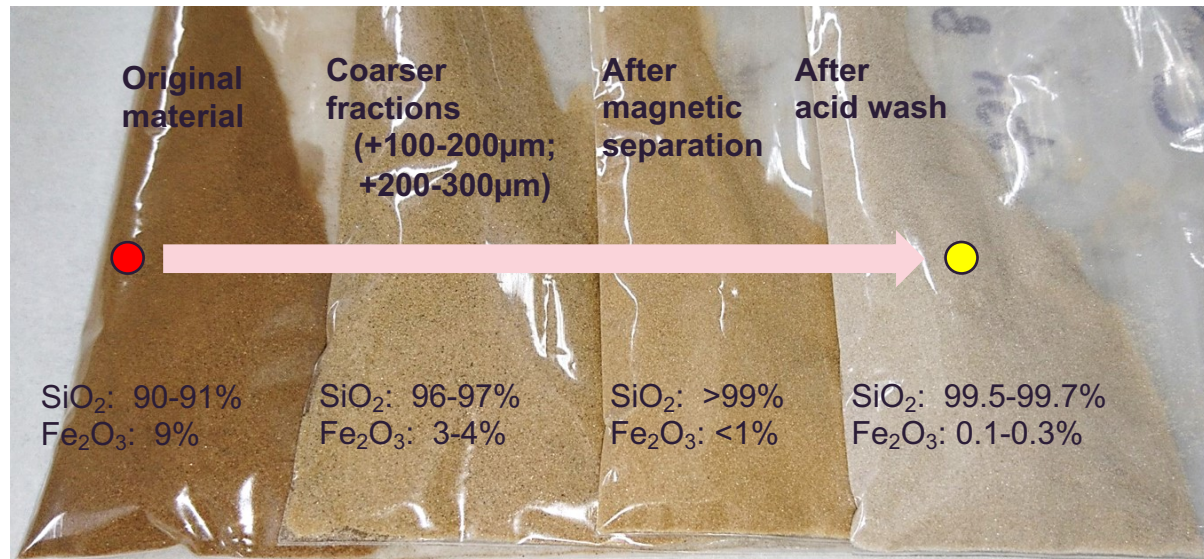
Very fine quartz-based sand

Residual iron oxides, very low trace elements

Very angular shape



D_{v10} : 60 μ m; D_{v50} : 134 μ m; D_{v90} : 271 μ m



Case 2 **Newmont** [Newcrest]

Sustainable Minerals
Institute
Ore-sand Co-production from Newcrest's
Cadia East HydroFloat® Reactor: An
Exploratory Study
Final Report to Newcrest Mining Limited
Authors: Dr Julianne Rogers-Gibson
Professor Daniel M. Franklin



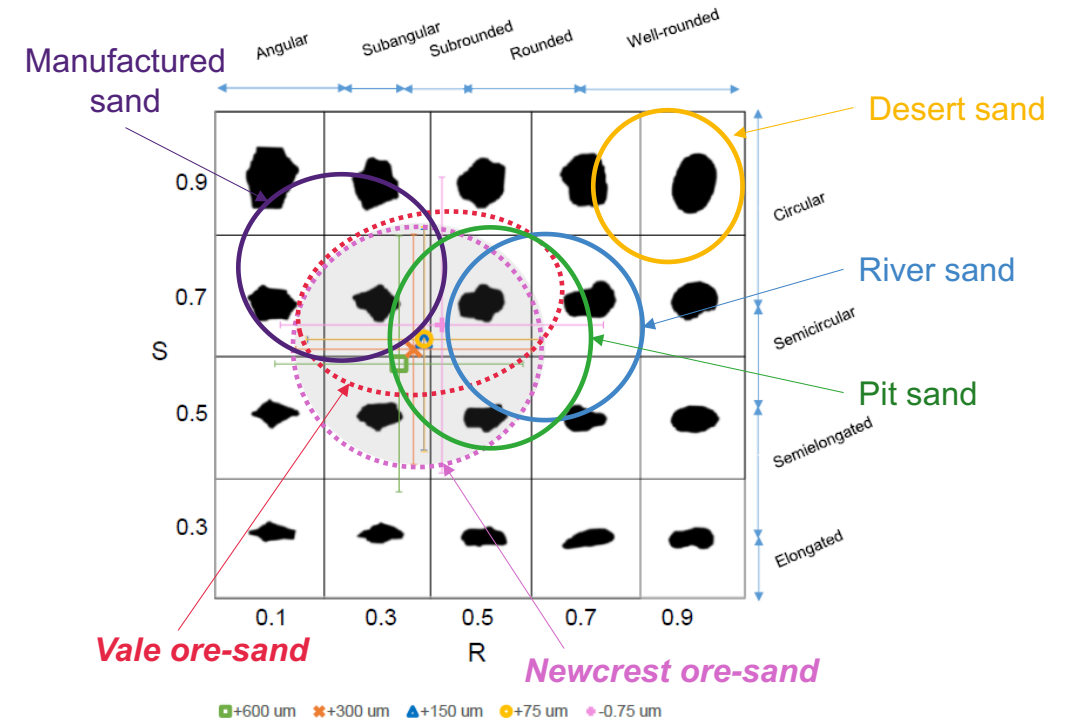
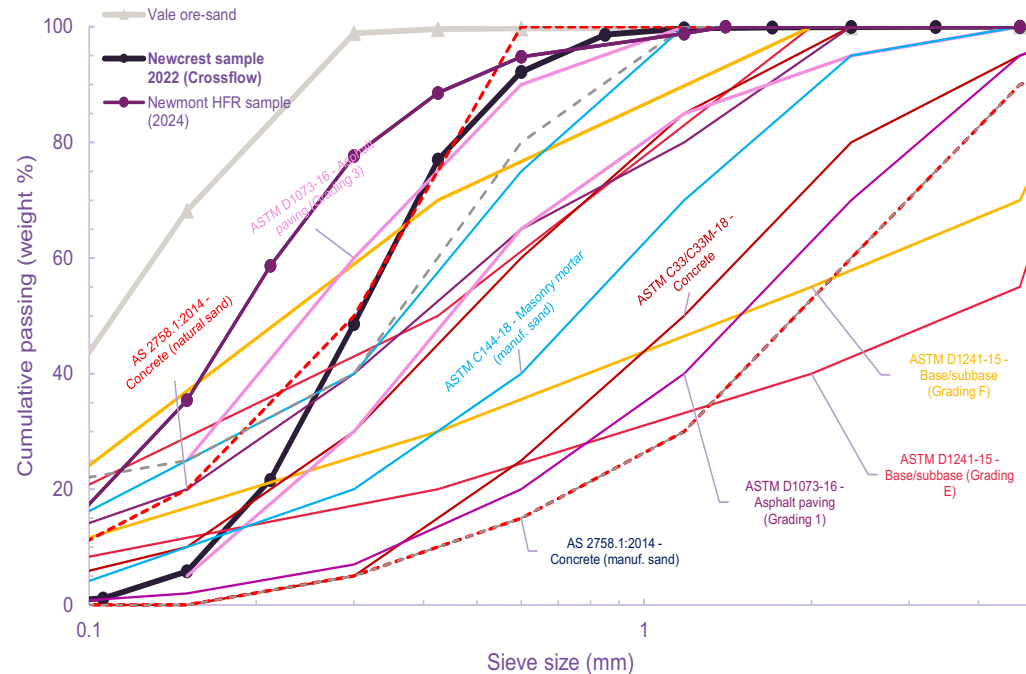
Demonstrates
HydroFloat® reject
stream materials are
suitable for construction
to TRL 5 @ Cadia East

Segura-Salazar et al; <https://doi.org/10.14264/96249f6>

*
Continuing with a new
Australian Economic
Accelerator Ignite grant
this year



Particle shape



Modified after: Muszynski et al. (2012), Golev et al. (2022)

Why a creative disruption?

Creative disruption is a *constructive alternative* to creative destruction — not just destroying the old, but transforming it through strategic adaptive innovation that provokes and inspires rather than dismantles

Following the lead of Gehman, J., Etzion, D., & Ferraro, F. (2022). *Robust Action: Advancing a Distinctive Approach to Grand Challenges*. Research in the Sociology of Organizations, Volume 79, pp. 259–278.

Added value to OreSand producers

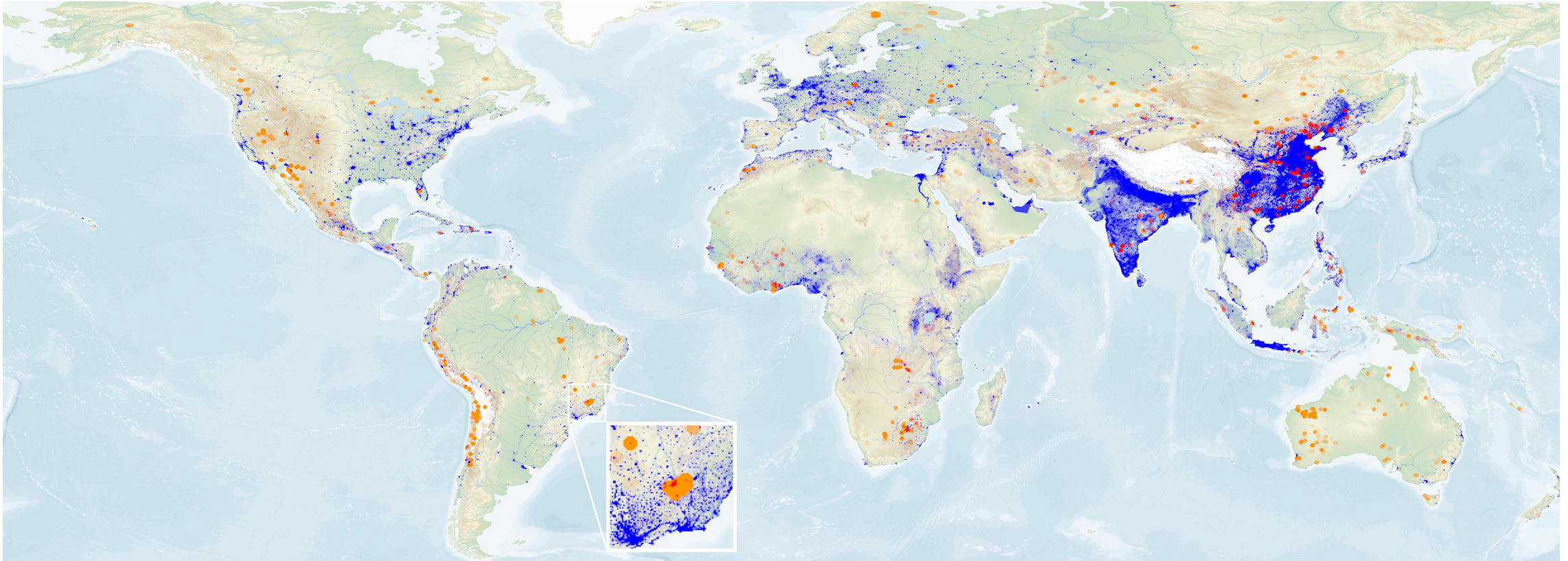
- Tailings storage and management risk and cost reduction
- Mineral processing circuit optimisation and efficiency gains
- Primary product production capacity and efficiency gains
- Expanded production portfolio
- A new story in the mining impact narrative

Added value to OreSand consumers

- Overburdened supply chains are threatening the delivery and maintenance of planned infrastructure
- Low-carbon primary sand product
- Limited alternatives: Natural, crushed and recycled aggregates all have risks and constraints to overcome
- Partnership models with traditional natural sand suppliers look promising

A scaled upstream circular economy solution

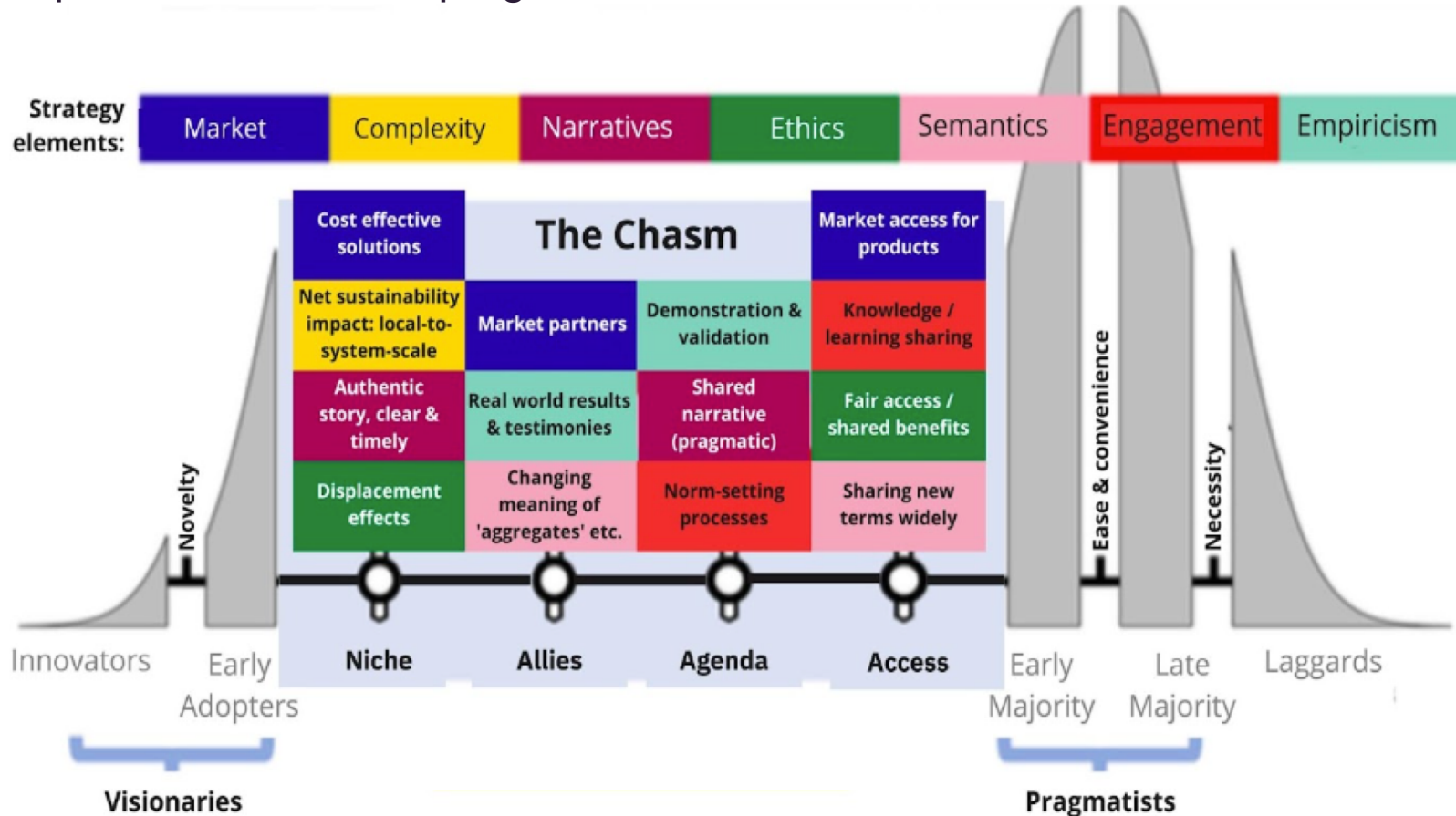
The sand we need. From the ore we already process.



Sand demand ~50 Bt/y | Mine waste production ~50 Bt/y

The challenge as we see it

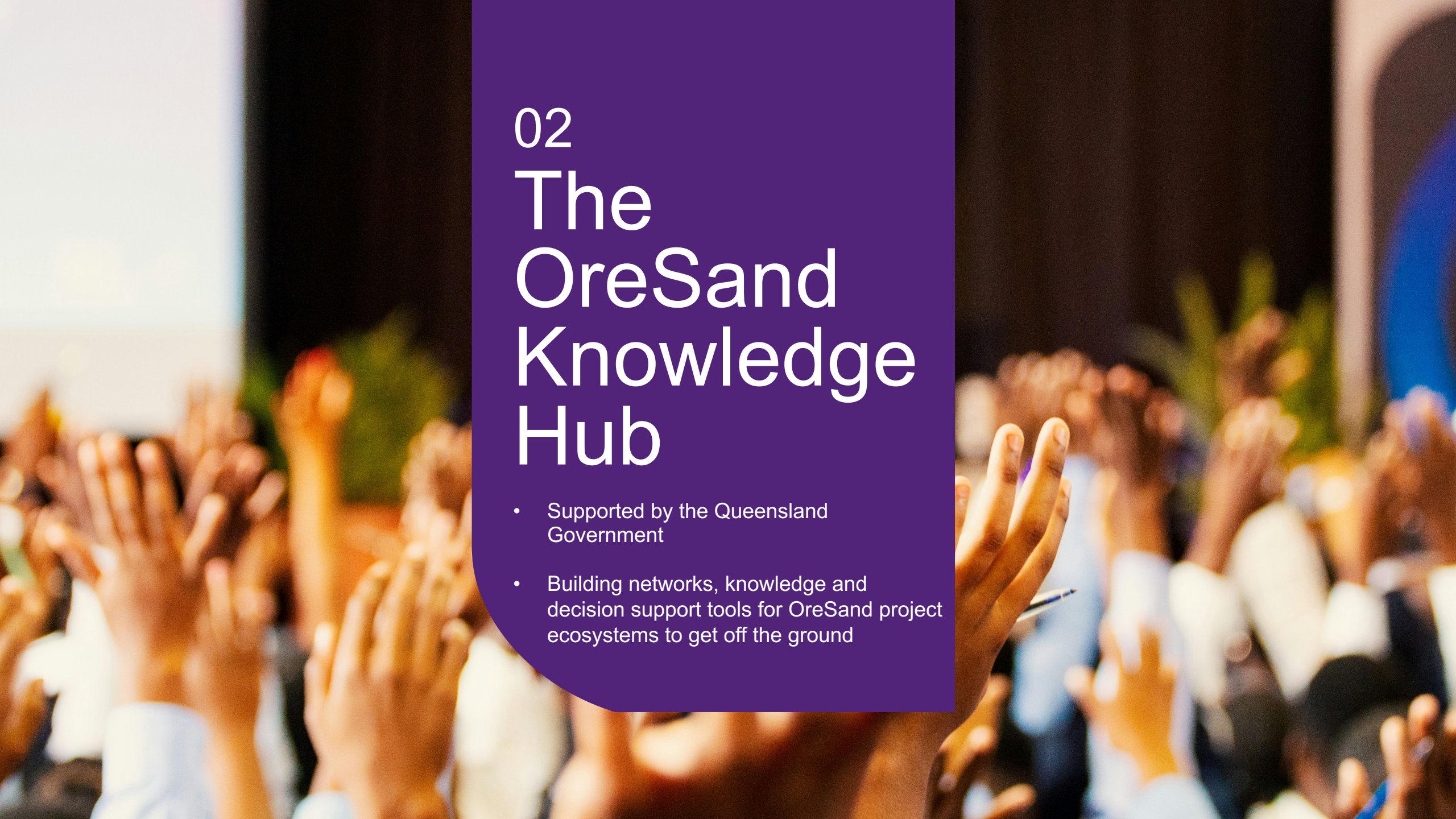
OreSand market uptake is a complex innovation adoption process. 'Crossing 'the chasm' between early adopters and majority market needs more than technical innovation. Different strategies are need to address market, established practices and other pragmatic needs in the mainstream market



01 OreSand Industry Research

- Experimental and applied research partnerships with supply and demand side industry leaders
- Tailored techno-economic and market analysis
- Co-funding model, public-private



A blurred background image showing a large crowd of people with their hands raised in the air, suggesting a celebratory or participatory event. The image is partially obscured by a purple overlay on the right side.

02 The OreSand Knowledge Hub

- Supported by the Queensland Government
- Building networks, knowledge and decision support tools for OreSand project ecosystems to get off the ground



03

OreSand Inc.

- Supporting companies with services and market relationships to realise their pathway to market
- A university commercialisation spin out effort | Top Innovator with the World Economic Forum's UpLink Platform

Thank you

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