Rethinking Water Management in Mining and Metals: Challenges, Innovation and Resilience

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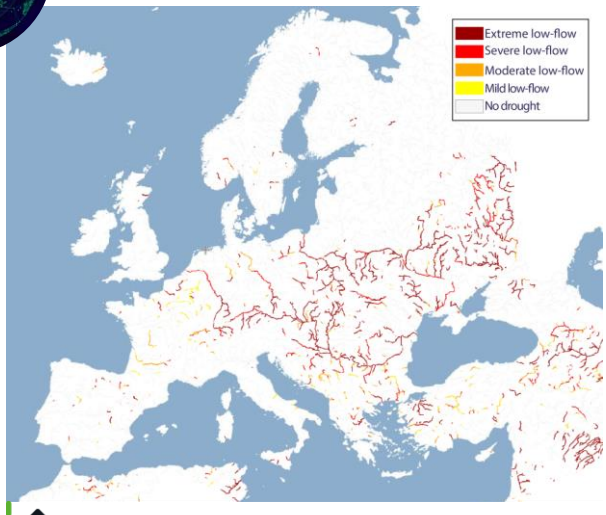
Water – a Shrinking Resource



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Water – a Shrinking Resource

What Does Water Scarcity Mean for Mining and Metals Industry

- Lower production
- Unplanned downtime
- Higher operating costs
- Regulatory constraints
- Competition for water resources
- Increased capital expenditure
- Growing operational and financial risks

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Innovations in Non-Ferrous Metals Industry

Global Patent Applications in Non-Ferrous Metals Industry by Application Area

Application Area	Estimated numer of Patent & Applications
Alloy Manufacturing & Processing	~18,000
Automotive & Aerospace Components	~12,000
Electrical & Electronics	~9,000
Energy & High-Temperature Systems	~6,500
Recycling & Environmental Solutions	~4,000

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Closed Plants in Recent Years in EU

List of the big-scale fully operational plants working in non-Ferrous Metals Industry, cloased during the last 4 years:

- **Hydro Slovalco** (Slovakia, 2022): Permanent stop of primary aluminium smelting due to high energy costs and lack of CO_2 compensation;
- **Speira Rheinwerk** (Germany, 2023): Closure of primary aluminium production;
- **Talum** (Slovenia, 2023): Shutdown of remaining electrolysis cells; transition to downstream and recycling operations;
- **Aldel** (Netherlands, 2022): Bankruptcy and plant closure amid energy crisis and financial difficulties;
- **Nyrstar Auby & Budel** (France/Netherlands, 2022–2024): Zinc smelters placed under care & maintenance due to soaring power prices;
- **Glencore Portovesme** (Italy, 2021 & 2024): Zinc line shutdown linked to energy market volatility and cost structure;
- **Exide Lille-Sud** (France, 2025): Closure of lead-acid battery plant driven by restructuring and overcapacity.

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Methods for Water Consumption Reduction

- **Water Recycling and Reuse – recirculating process water**
- **Closed Loop Water Systems – minimising water losses and wastewater discharge.**
- **Water Efficient Processing Technologies – optimising grinding, flotation and ore washing**
- **Leak Detection and Water Monitoring – identifying losses and improving efficiency of water use**
- **Alternative Water Sources – using treated wastewater, desalinated seawater, etc.**
- **Dry Processing Technologies – reducing or eliminating water use in selected processing stages**

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MARCLAIMED – example of new water approach

Estimated evaporation: 250 – 350 m^3/h

2,2 – 3 mln m^3/ year

Estimated cost: 1,5-4 mln €

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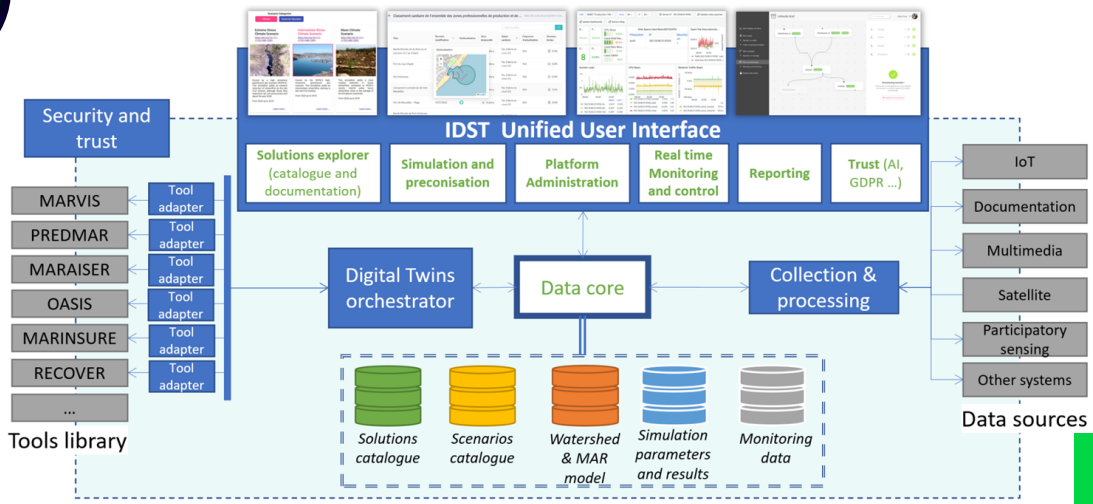
MARCLAIMED – example of new water approach



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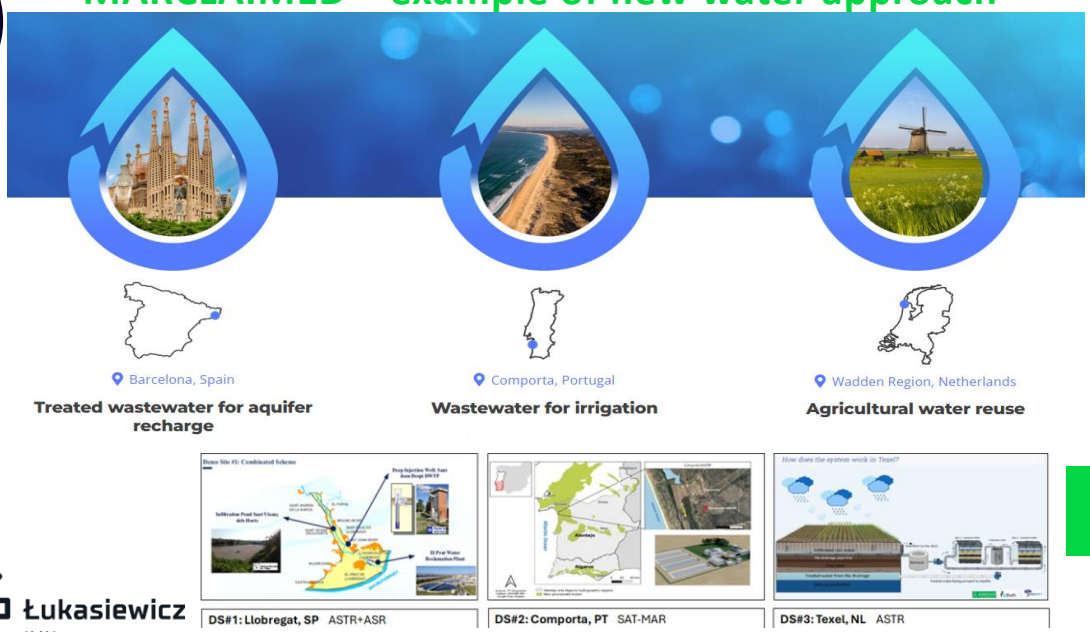

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Rethinking – Strategy for the Innovations – witch approach is better? – examples

Optimization of cooling circuits can save up to 150 m^3/h only by changing the composition of cooling water by adding a stream of treated wastewater to the system (approx. 900 000 €/year)

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Rethinking – Strategy for the Innovations – witch approach is better? – examples

Ozonation processes and desulfurization technologies can greatly increase a possible production capacity in case of strict environmental limits

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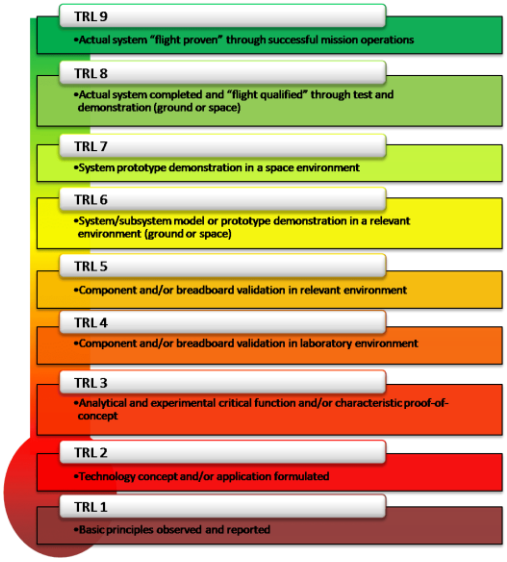
Conclusions: Rethinking – Strategy for the Innovations



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Thank You for Your Attention

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