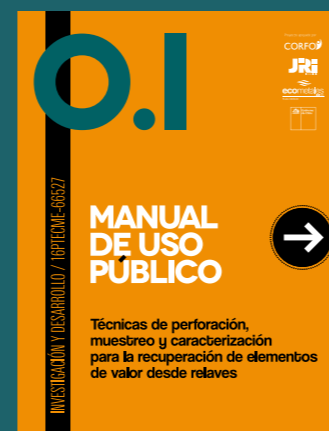


RECOVERING VALUE FROM TAILINGS TOWARDS MORE SUSTAINABLE MINING



EcoMetales, a subsidiary of Codelco, and JRI Ingeniería are completing a program, financed by CORFO, to propose strategies for evaluating potential businesses related to the recovery of value from mining tailings. The program addresses one of the mining industry's key challenges and forms part of the High Grade Program's Chilean Mining Roadmap 2.0, which promotes the transformation of liabilities into assets.



TOWARDS A CIRCULAR ECONOMY

Can increase competitiveness, especially in medium and small-scale mining.	Known and efficient processing technologies exist.
Remediates environmental liabilities and reduces the volume of tailings dams.	Facilitates mine closure: reduces costs and can even contribute resources.
Reduces the risks of contamination by tailings out of line with standards.	Increases the availability of land for other uses.

Recovering value from tailings is known as **secondary mining** and involves working with waste as a resource. In other countries, secondary mining represents 30% of total mining and has an important impact on the economy but, in Chile, accounts for less than 1%.



WASTE, TAILINGS, RESOURCES

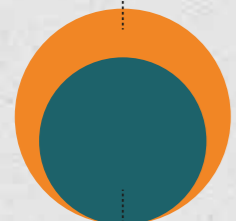
CORFO Technological Program, JRI-EcoMetales



TAILINGS AND MINING IN CHILE

WHAT IS GENERATED

by 2030
1,000
million tonnes/year

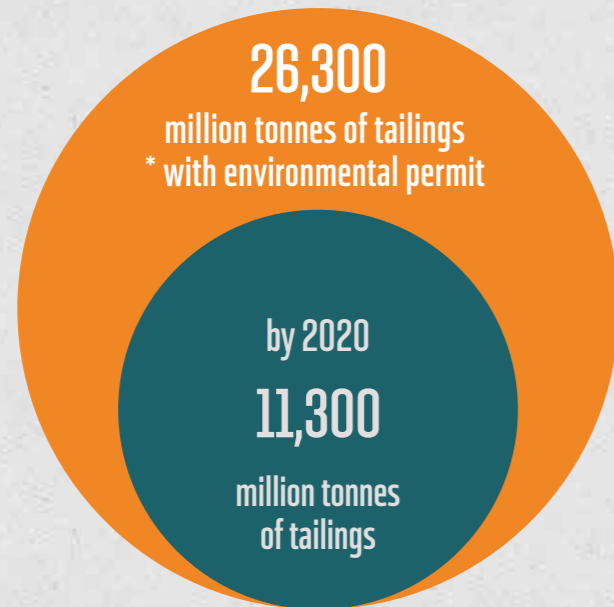


by 2020
600
million tonnes/year

Why does the amount of tailings increase?

Tailings are increasing and will continue to increase because the grade of the minerals being processed is dropping, implying that ever more material must be processed to produce the same amount of fine copper.

WHAT ACCUMULATES



Does not include * tailings from projects

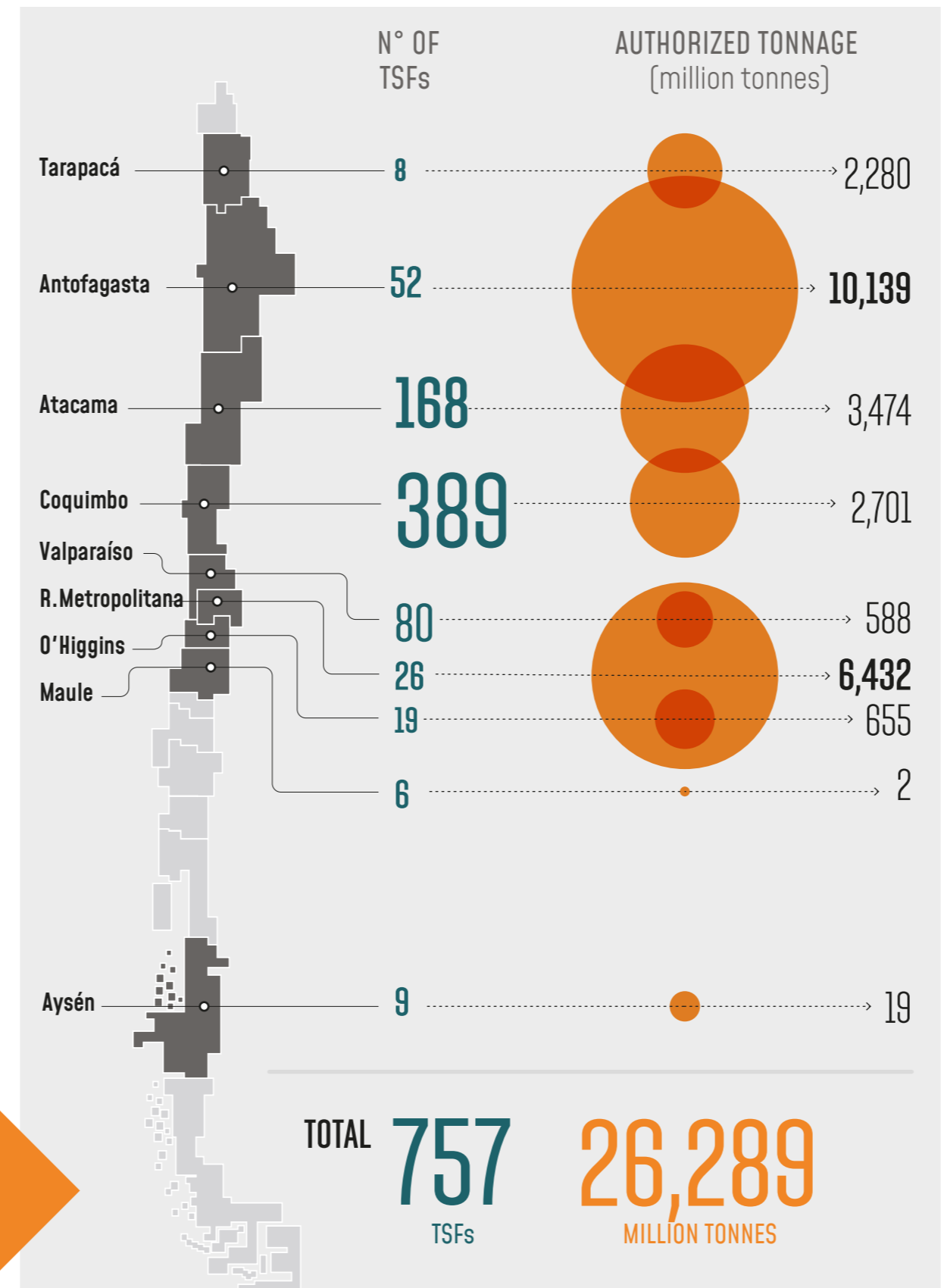
In Chile, 757 TSFs have been identified



www.sernageomin.cl

When evaluating the treatment of a tailings dam, its age, location, proximity to populated areas, safety conditions and environmental impacts must be taken into account. It is essential to dispose of the re-treated tailings safely and at a low cost.

REGIONS WITH MORE TAILINGS STORAGE FACILITIES



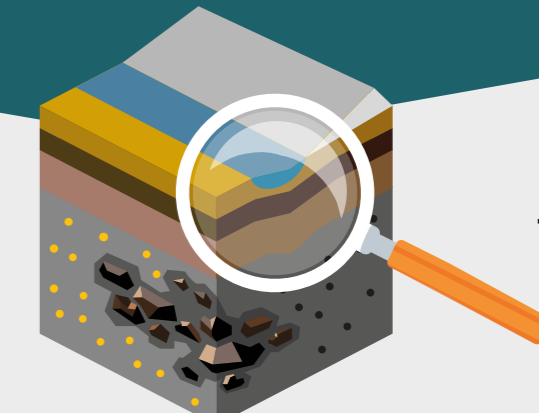
SOURCE: Sernageomin, Survey of Tailings Storage Facilities in Chile, August 2020.

JRI & EcoMetales- CORFO

HOW TO RECOVER VALUE FROM TAILINGS

I Characterization

What does the matrix of minerals contain and how is it presented?



RESULT: KNOW THE TAILINGS MATRIX AND INTERPRET IT.

II Identification of processes

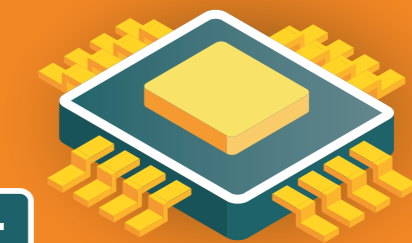


RESULT: DESIGN OF A PROTOTYPE PROCESS FOR RECOVERING VALUE FROM TAILINGS.

III Validation of prototype

In their program, JRI & ECL recovered elements such as:

Fe **Cu** **REE**



RESULT: PROTOTYPE VALIDATED AT THE LABORATORY LEVEL, SCALABLE IN SEMI-INDUSTRIAL EQUIPMENT.