

# CIRCULAR ECONOMY STRATEGIES APPLIED TO CRITICAL RAW MATERIALS IN AVIATION

## What are critical raw materials?

Critical raw materials are **economically important** and have **high supply risks**.

The supplies might undergo disruptions; supplies would no longer be able to meet the demand of economically important resources.

## Why are CRMs relevant for the aviation industry?

The aviation sector needs to shift to **sustainable propulsion systems**. Smaller aircraft are becoming electric.

CRMs are required for such components: batteries that contain **lithium** and **cobalt** and electric motors that contain **neodymium** and **dysprosium**.

The demand for battery and electric motor materials is increasing rapidly.

**Fig. 1** shows a forecast by the European Commission for material demand in the EU in 2030 and 2050. The graph shows additional material consumption in the renewables and e-mobility sectors with respect to the current levels.

## How can CRM applications benefit from circular economy strategies?

Recycling can **reduce supply risks**, and the end-of-life recycling input rate (EOL-RIR) is already part of the European CRM framework.

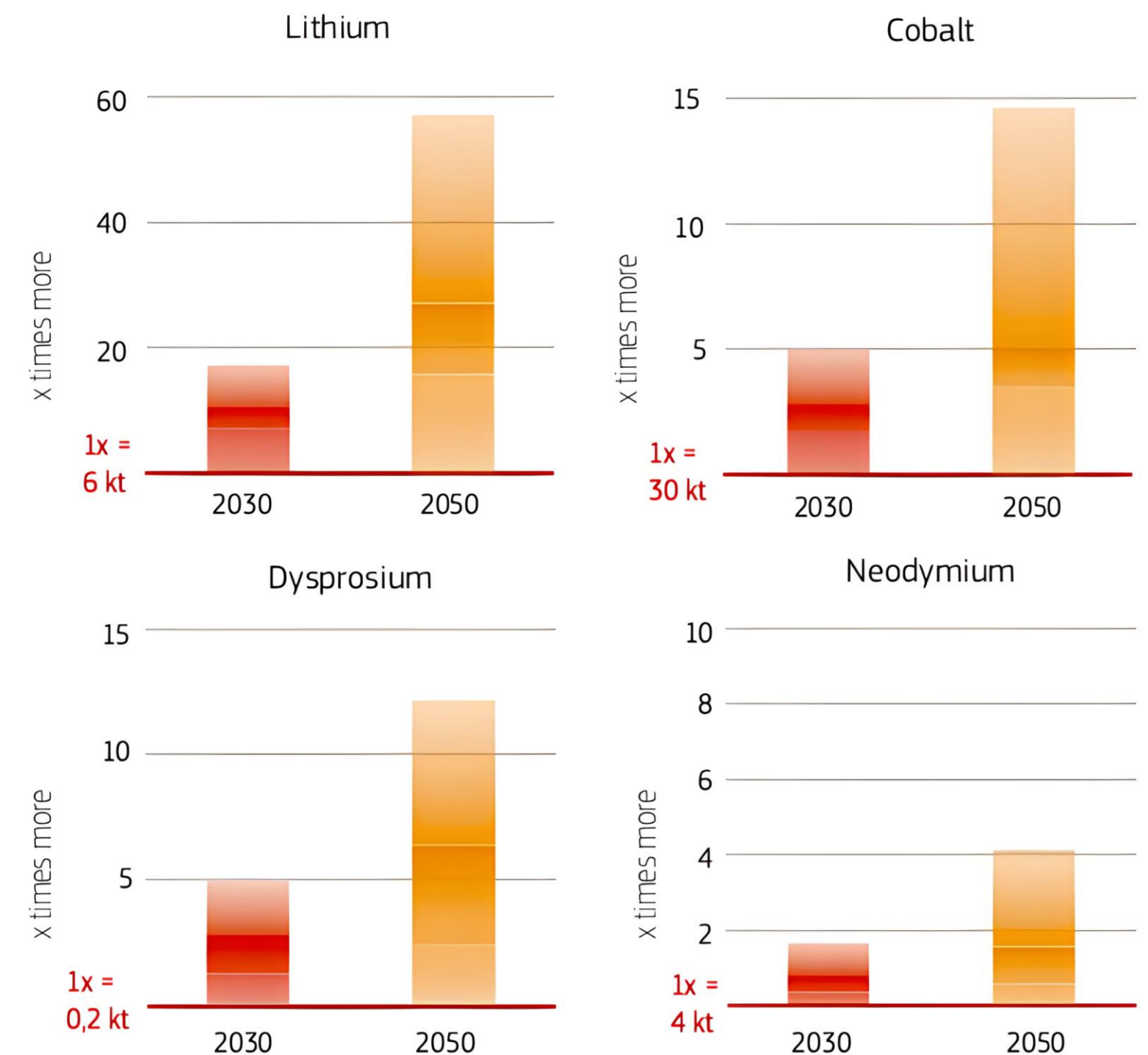
The objective is to suggest a framework that can be used to incorporate other circular economy strategies to the European CRM assessment, such as **remanufacturing** and **repurposing**.

A case study will be conducted to implement the suggested framework for components in sustainable aviation.

Lithium ion batteries



Permanent magnet synchronous motors



**Fig. 1:** EU assessment forecast for material demands.



Aircraft class	Seating capacity	Global fleet	Future fuel
Commuter	0-19	4%	⚡
Regional	20-80	13%	⚡ H <sub>2</sub>
Short-range	81-165	53%	H <sub>2</sub>
Medium-range	166-250	18%	🌱
Long-range	251+	12%	🌱