



Johnson Matthey
Inspiring science, enhancing life

Sustainable Product Development and the Role of Recycling

Ruth Leland, Sales and Marketing Director



Accelerating the transition to a cleaner, healthier world

Our vision is for a world that's cleaner and healthier. And so we are making it our business to help address the four essential transitions the world needs for a sustainable future.

Just one of our targets is net zero by 2040.



It's not just JM with aspirations for a cleaner world.....



Volvo

Headquarters: Gothenburg, Sweden

Revenue: \$40bn

From 2030, Volvo Cars will only sell electric vehicles. They will be climate neutral by 2040 and be a circular business by 2040.



Nestle Good food, Good life

Nestle

Headquarters: Vevey, Switzerland

Revenue: \$93bn

The food giant aims to halve their emissions by 2030 and go on to achieve net-zero by 2050. Between those key dates, Nestle will investigate ways to offset remaining emissions.



Apple

Headquarters: California, USA

Revenue: \$274bn

Apple will become entirely carbon neutral across business and manufacturing by 2030 and its devices will be sold as "zero climate impact" items.

A quick check on definitions..

Carbon Neutral Versus Net-Zero

Carbon-neutral

- Purchasing carbon reduction credits equivalent to emissions released, without the need for emissions reductions.
- Projects include renewable energy generation (e.g. solar and wind projects)

Net-zero

- Means reducing emissions in line with latest climate science, and balancing remaining residual emissions through carbon removal credits.
- Projects involve CO2 removal technologies or matured reforestation (min 10 years).

Carbon footprint versus Carbon Handprint

- In the **footprint** method, the goal is to reach a zero footprint.
- With the environmental **handprint**, there is no upper limit to its positive effects. It's calculating the positive climate impacts of a product provided to customers.
- The carbon handprint of a product is measured by comparing the carbon footprint of the new solution used by customers to that of the old solution.

How will companies achieve greater sustainability??

Product Development

Choice of suppliers & business partners

What is the end of life process ?

Supply chain efficiency

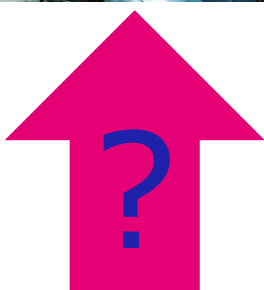
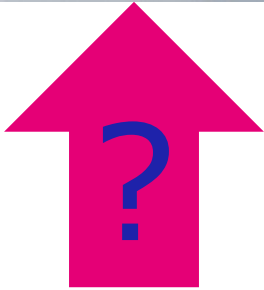
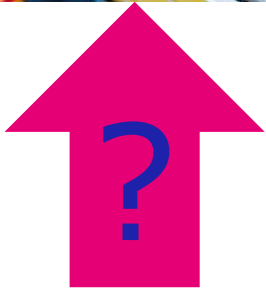
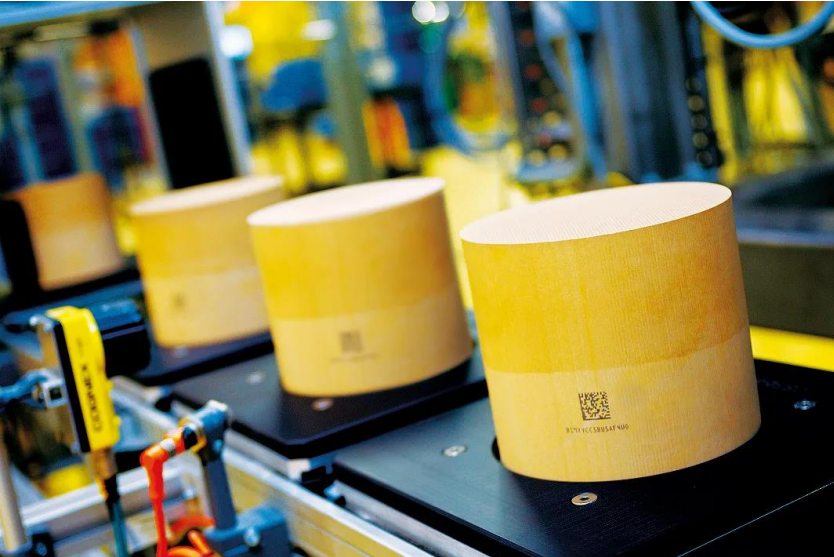
How they go to market

How their products are used ?

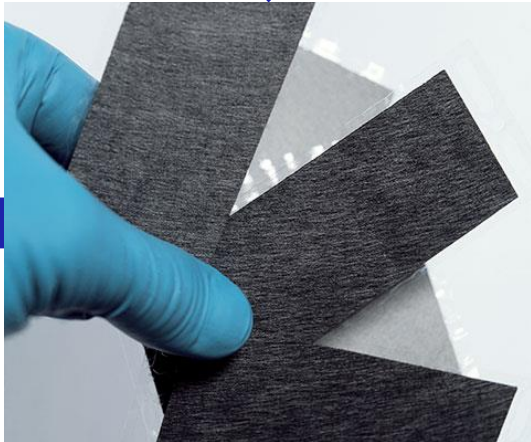
Use of Resources

Is it circular?

When to consider end of life?



Design to refine enables circularity



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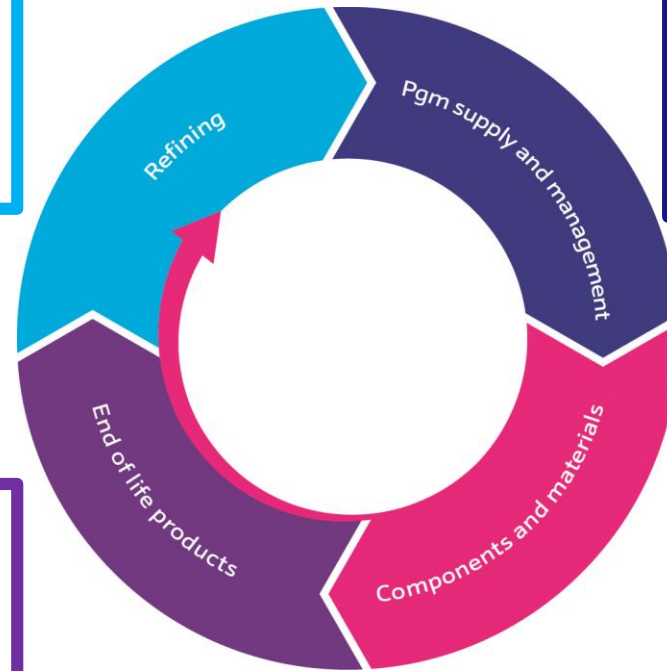
What does circularity mean for precious metals?

Refining:

- Greater demand for recycled ounces
- Technical requirements of new materials

PGM Supply and Management:

- Provision of recycled ounces
- 5 PGM demand met by recycling: 2016 25% 2021 30%
- Greater need for traceability
- Stored, moved, used responsibly



End of Life Products:

- Complex materials
- Methodology – lower impact treatment
- Length of supply chain
- Legislation

Components and Materials:

- Sustainable sourcing
- Carbon footprint of product manufacture
- Green credentials of suppliers

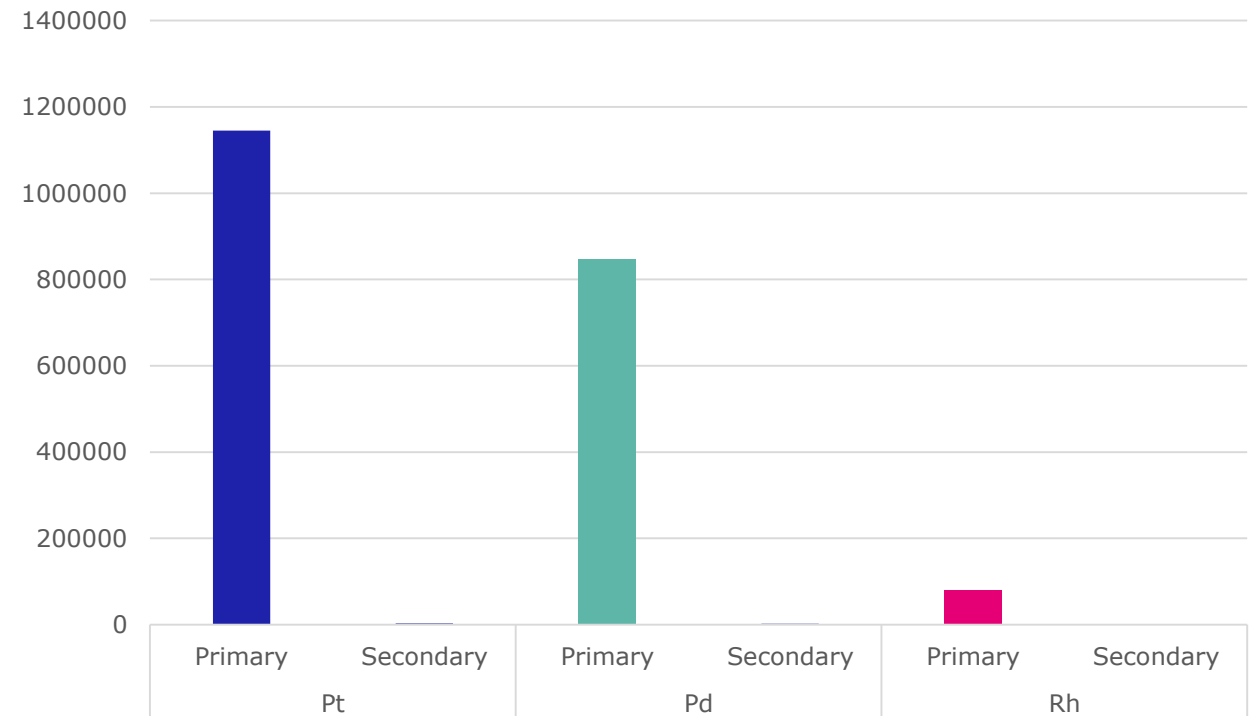
Secondary Refining and Sustainability

The emissions associated with secondary supply are materially lower than for primary

Pt:	high carbon intensity	high volume
Pd:	lower carbon intensity	high volume
Rh:	high carbon intensity	low volume

- Primary PGM has footprint of ~ 1 tonne CO₂ per Toz
- 1 tonne of CO₂ is roughly the equivalent of one person flying economy from London to Moscow and back
- Secondary PGM is 50 -100 times lower GWP compared to primary

Total GHG emissions by metal source FY20/21



Summary

- End of life starts at product conception
- Technical problems will be solved upfront
- Recycling and every part of the end of life supply chain will be interconnected with the product design and supply
- Circularity will drive the value proposition
- Recycled ounces are growing in value
- Green traceability is vital
- There's opportunity everywhere to build a sustainable future

A woman with long, wavy brown hair, wearing a bright yellow sweater and blue jeans, stands on a balcony with a metal railing. She is looking out over a vast, deep fjord with turquoise water, surrounded by steep, forested mountains. The scene is captured from behind her, emphasizing the expansive natural beauty.

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