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CIRCULAR ECONOMY

3 circular economy approaches to reduce demand for critical metals

Jul 18, 2022

Winnie Yeh

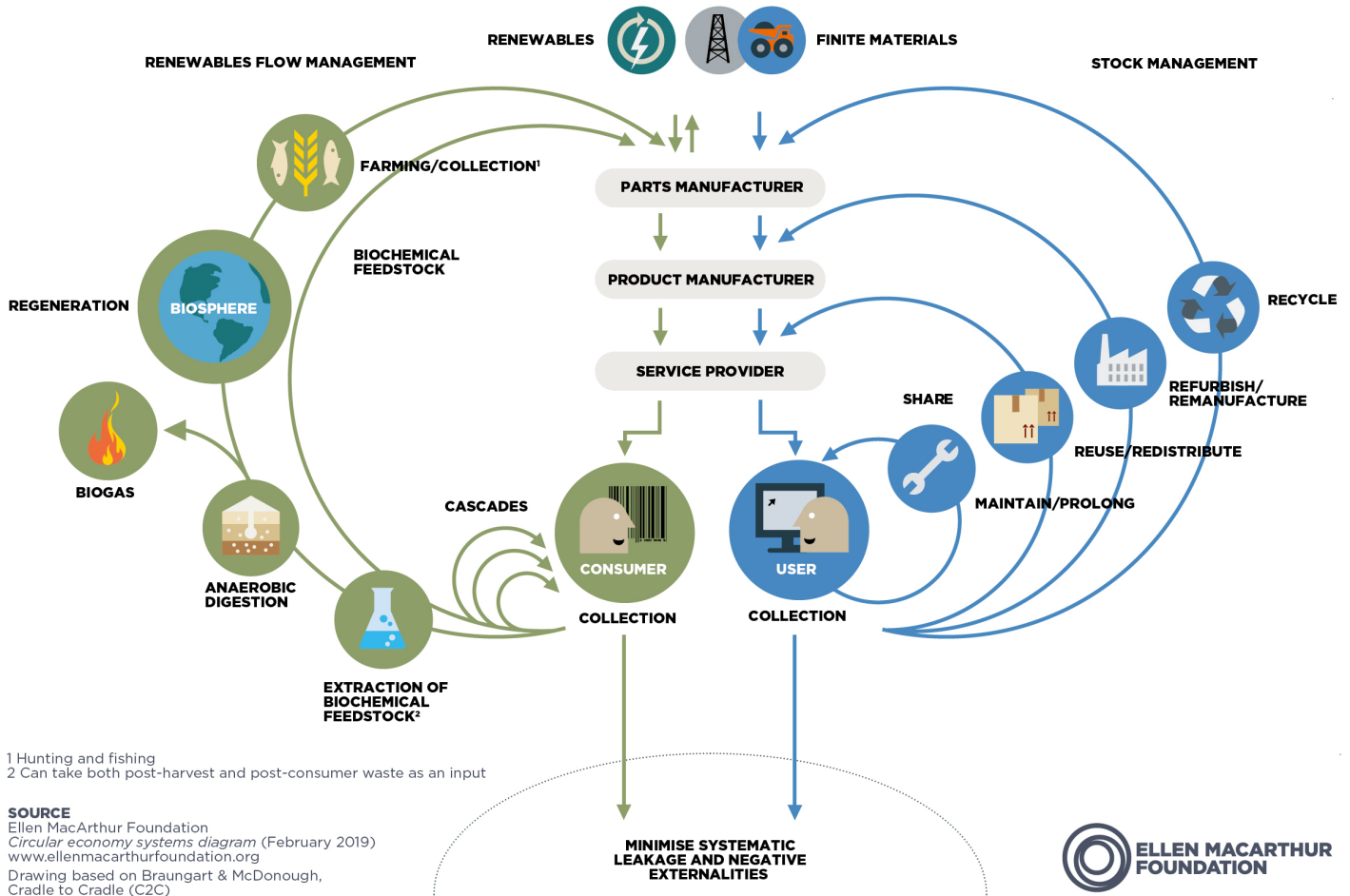
Lead, Responsible Sourcing, World Economic Forum Geneva

- **Shifting from fossil fuels to renewables requires huge amounts of critical metals.**
- **Recycling alone won't be enough to sustain the amount of materials needed**
- **We need to increase sharing, reuse and a preference for longevity to reduce demand.**

We need a clean energy revolution, and we need it now. But this transition from fossil fuels to renewables will need **large supplies of critical metals** such as cobalt, lithium, nickel, to name a few. Shortages of these critical minerals could **raise the costs** of clean energy technologies.

One obvious route is to mine more virgin material, but this comes with its own costs and potentially unintended consequences. Another solution commonly discussed is to recycle more and use the metals already in circulation. The complication is that we do not currently have enough metals in circulation, and even with recycling taken into consideration, mineral production is still forecasted to increase **by nearly 500%**. So how should we proceed?

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On the circular economy system diagram by the Ellen MacArthur Foundation, metals fall on the right-hand side of the diagram. This diagram shows a prioritization of approaches. The levers in the inner circles such as “maintain” and “remanufacturing” should be prioritized over those further outside, such as recycling. Source: Ellen McArthur Foundation.

1. Go from owning to using

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While most already have a personal phone, [39% of workers](#) globally have employer-provided laptops and mobile phones.

This is not at all resource efficient. More sharing can reduce ownership of idle equipment and thus material usage. [Car sharing](#) platforms such as [Getaround](#) and [BlueSG](#) have already seized that opportunity to offer vehicles where you pay per hour used.

To enable a broader transition from ownership to usership, the way we design things and systems need to change too. For example, car sharing is made possible by new [keyless](#) unlocking features. Similarly, [user profiles](#) that create a distinction for work and personal use on the same device is needed to reduce the number of devices per person. A design process that focuses on fulfilling the underlying need instead of designing for product purchasing is fundamental to this transition. This is the mindset needed to [redesign cities](#) to [reduce private vehicles](#) and other usages.

2. Enable preference for longevity

Who doesn't want to get the most out of everyday products like washing machines, and increasingly domestic solar panels? Increasing a product's longevity can reap significant dividends. Keeping a smart phone for five years instead of three reduces the phone's annual carbon footprint [by 31%](#).

The trouble is product companies are incentivized to sell more, not to design for longevity. While some product makers are transitioning to

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[Buy Me Once](#) offers only products that last for life. Their customers [save both time and money](#), in addition to environmental benefits. However, more data and consistent durability metrics are needed before we can easily compare and choose [durable products](#).

DISCOVER

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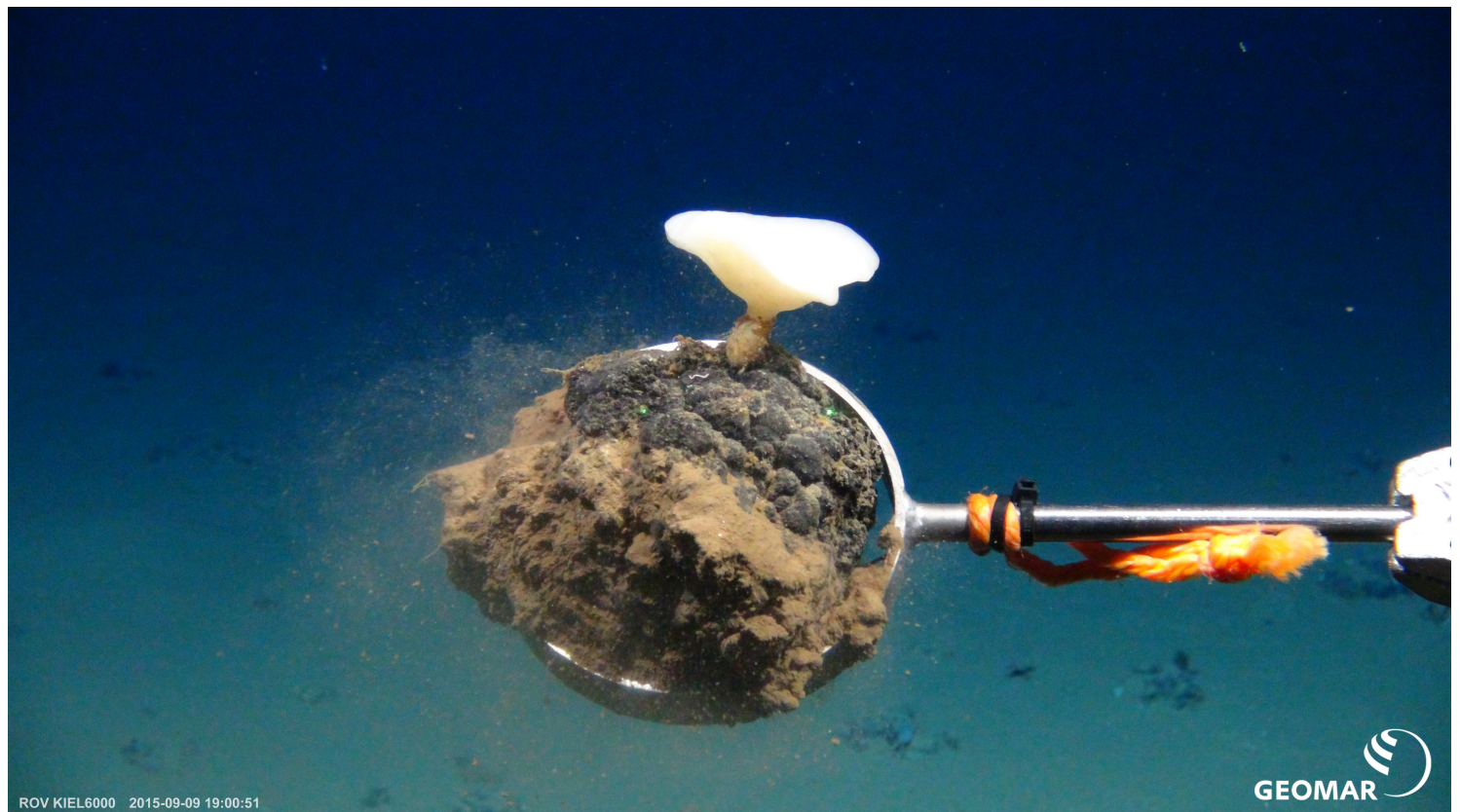
3. Build pride in second life

What if something can no longer be used for the purpose it was originally sold for? When an electric vehicle battery is replaced, it may still have up to [80% capacity remaining](#). Already, retired electric vehicle batteries have been repurposed to [power streetlights](#) and a [stadium](#). General Motors is beginning to design batteries with the ease of transition to a [second life](#) in mind. Refurbished consumer electronics are slowly coming into fashion with start-ups such as [Back Market](#) and [Refurbed](#).

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equipment to its original performance level. For large-scale investments, such as wind turbines, it can almost double the return on original investment by extending the turbine life by [up to 20 years](#).



Manganese nodule with a deep-sea sponge. MiningImpact Expedition SO242. Source: ROV KIEL6000, GEOMAR.

Introducing more of these circular models require significant effort and changes to our current way of life. Yet unless we can reduce metal demand quickly, we will need more new mines. Mining has been called the “[blind spot](#)” of the green energy transition. On land, it has been associated with

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[organizations](#) and [more than 600 experts](#) are cautioning against doing so.

Much of the debate around opening new mines is shaped around supply and demand. A [2022 World Economic Forum white paper](#) identified the question, “do we need these minerals?” as one of the [knowledge gaps](#) that need to be filled before a decision could be made on deep-sea mineral stewardship.

This transition to a fully circular model is now more urgent than ever. If we are to move forward, we need to reconsider at a systemic level how much we use, as well as how we can reduce usage. Unless we can dramatically reduce current metal usage, the debate and tension on finding new mines will not go away.

Have you read?

- [The answer to the aluminium industry's emissions issue? Aluminium's infinite recyclability](#)
- [Should deep-sea minerals be part of battery supply chains?](#)

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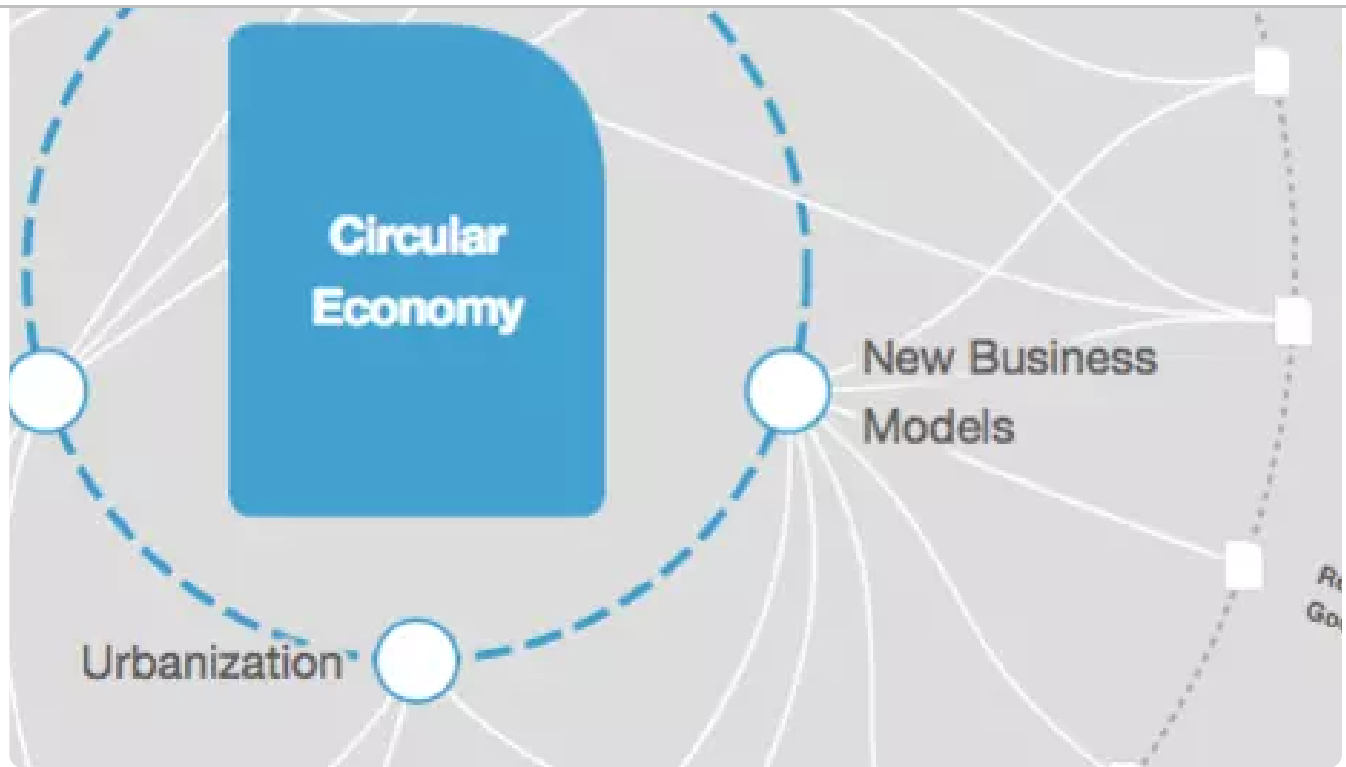


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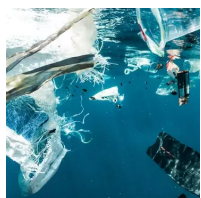
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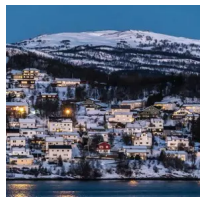
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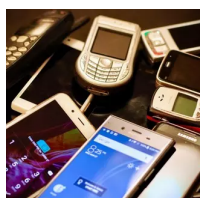
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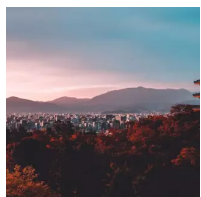
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