

Circular Design Solutions: Addressing the Electronic Waste Crisis

Design and Technology Lesson 3
Utilising the Rs of Sustainability in Designing

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The Rs of Sustainability



Investigate how you can reduce the impact of an electronic product and its packaging from the point you purchase it.



Refuse

Refusing is the process of rendering a product obsolete by either eliminating its purpose or providing the same function with a fundamentally different product.

A prime example is the decline of CDs. In the '90s, everyone carried CD collections and used discmans for music. Today, music is easily accessible through various digital platforms, rendering CD technology obsolete.

This approach significantly reduces the demand for raw materials and resources required to deliver the same service. It hinges on innovative thinking, technological advancements, and changes in consumer behaviour.





Rethink

Rethinking is all about changing how we use things. Take electric scooter (e-scooter) sharing, for example. Instead of everyone owning their e-scooters that mostly sit idle, many cities offer shared e-scooters that people can use when they need them.

In the past, we used to carry around separate gadgets like portable music players, digital cameras, and mobile phones. But now, we have one device that does it all.

Rethinking needs creative thinking. It helps us use our resources and devices smarter. But remember, it's not always easy because it means changing how people do things.



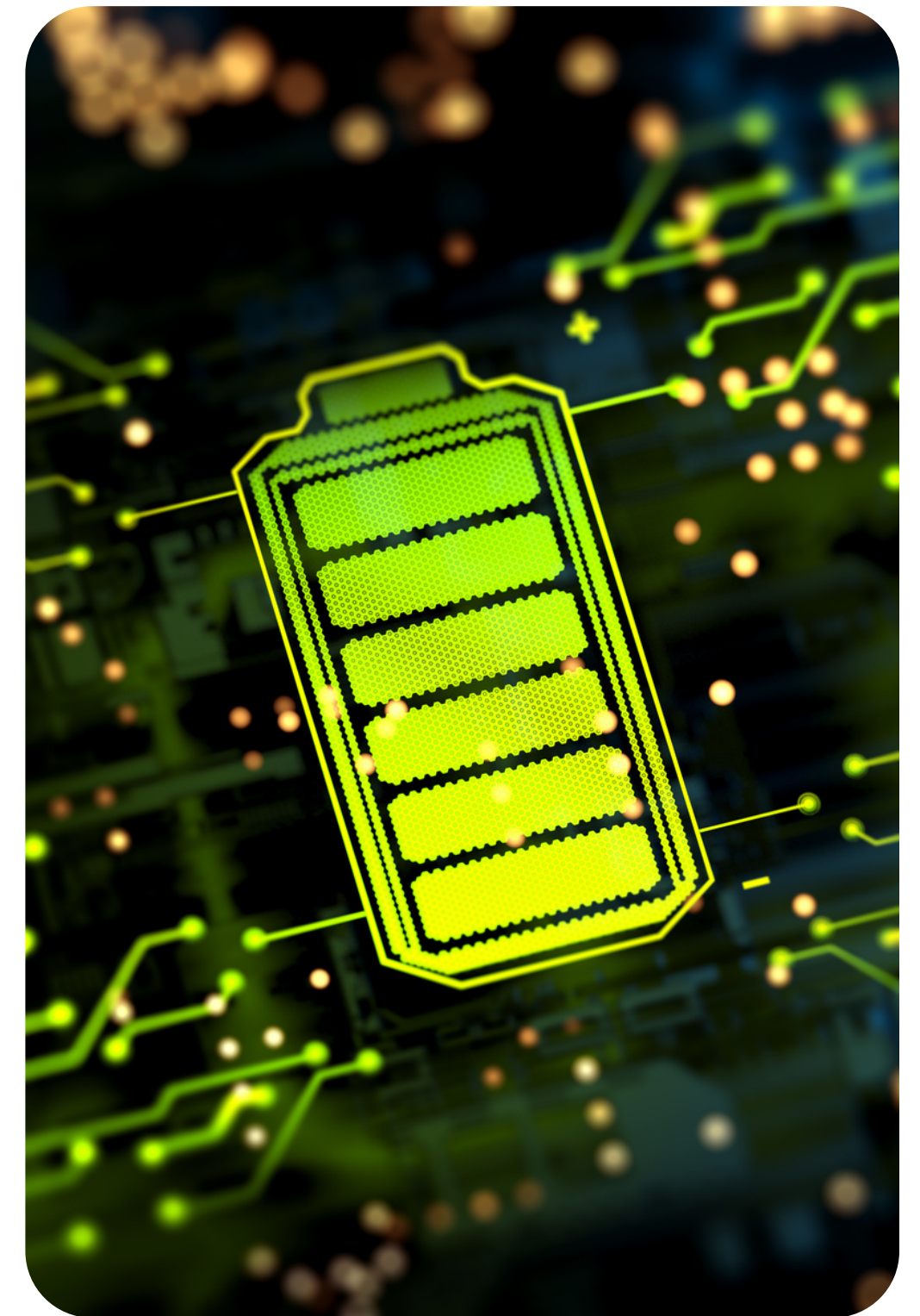


Reduce

Reducing is all about making products in a smarter way, using fewer natural resources, materials, and energy. It might mean making things smaller or developing new technology like super-efficient batteries.

By doing this, we use fewer resources and energy when making the product, which is much better for the environment.

It can take a lot of research and development, but in the end, it saves companies time and money because they make more efficient products.





Reuse

Reusing happens when someone else uses a product that's still in good shape for the same purpose. Such as a parent passing down a phone to their child or a company donating old devices to a school or charity.

When we reuse products, we keep using it for what it was meant for.

This saves materials and cuts down on the energy needed to make a brand new product, which is far more energy-efficient.





Repair

Repairing means fixing a device by addressing the broken parts instead of getting a new one. For example, soldering a loose speaker cable or cleaning a camera lens to make it work smoothly again.

Repairing doesn't need a lot of new material or energy. It can make a device almost as good as new while keeping it functional.

But, it depends on having people who know how to repair and the right tools, product materials and repair manuals/knowledge to do it.





Refurbish

Refurbishing means giving an old product a makeover by adding new or updated parts. For instance, if there's a new battery for a phone, you can swap out the old battery for one that fits the phone and may have longer life than the original.

This makes the device last longer and saves most of the materials and energy used to create it.

However, there's some leftover material from the old parts that are no longer needed, and you will need new materials for the updated components.



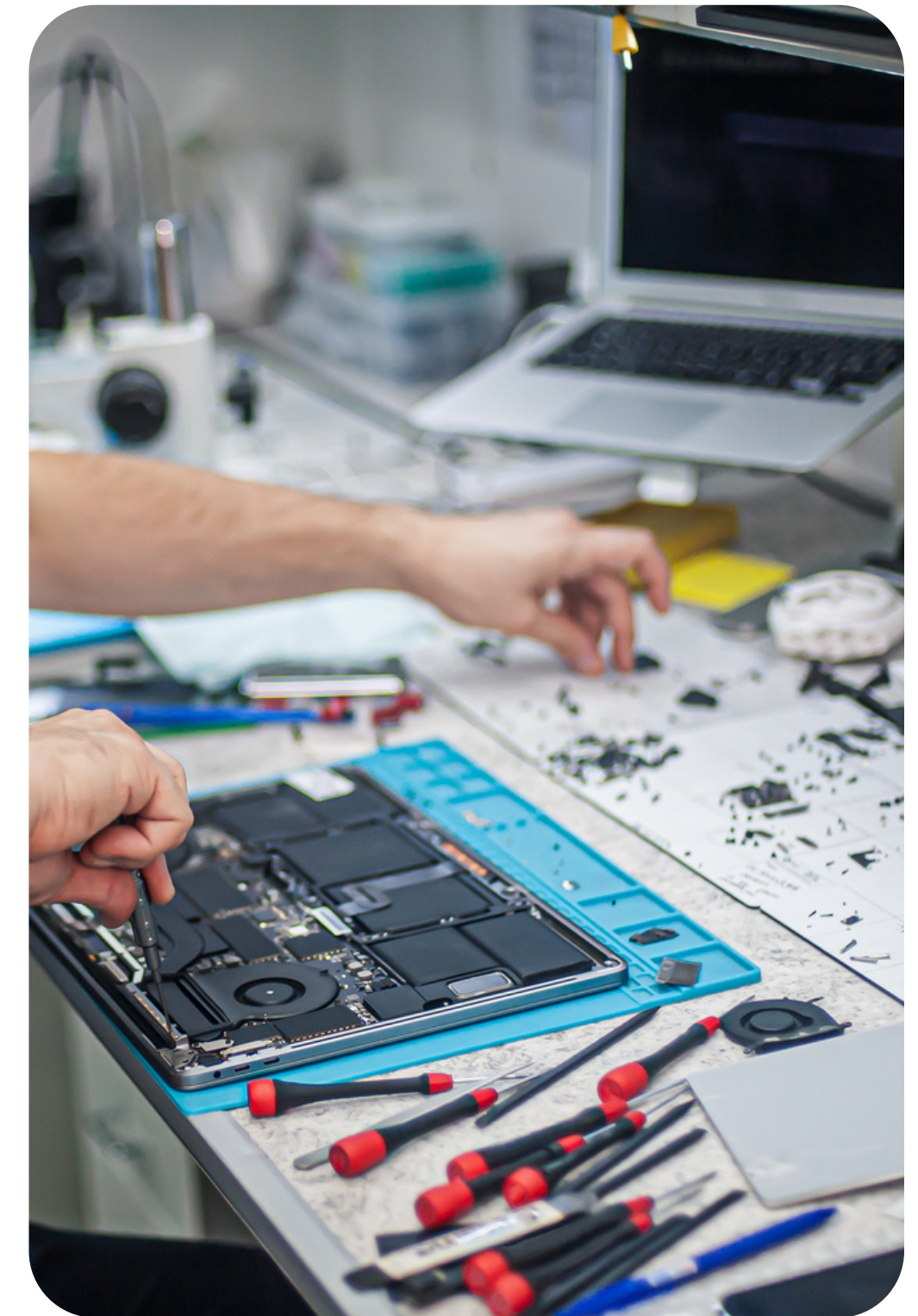


Remanufacture

Remanufacturing is when we take parts from something we don't need anymore and use them in a new product that serves the same purpose. For example, we can recover a keyboard or internal parts from an old laptop and put it in a new one.

This way, we reuse the materials from the laptop and save all the energy that went into making that part. It's like giving it a second life at its best potential.

But it can get tricky, especially with fast-evolving technology. Sometimes old and new components don't work well together. So, while it's great to use some of the original parts, not everything might work.





Repurpose

Repurposing is when you take old product or parts from a product and give it a new job. Like turning an old camera into a bedside light or making an old tablet a fancy photo frame.

It's a smart move because it saves energy and materials.

But here's the thing: sometimes, not everything gets used, and you might not get the most out of what you've got. For instance, when you use an old tablet as a photo frame, there are still parts inside the tablet that don't get used.



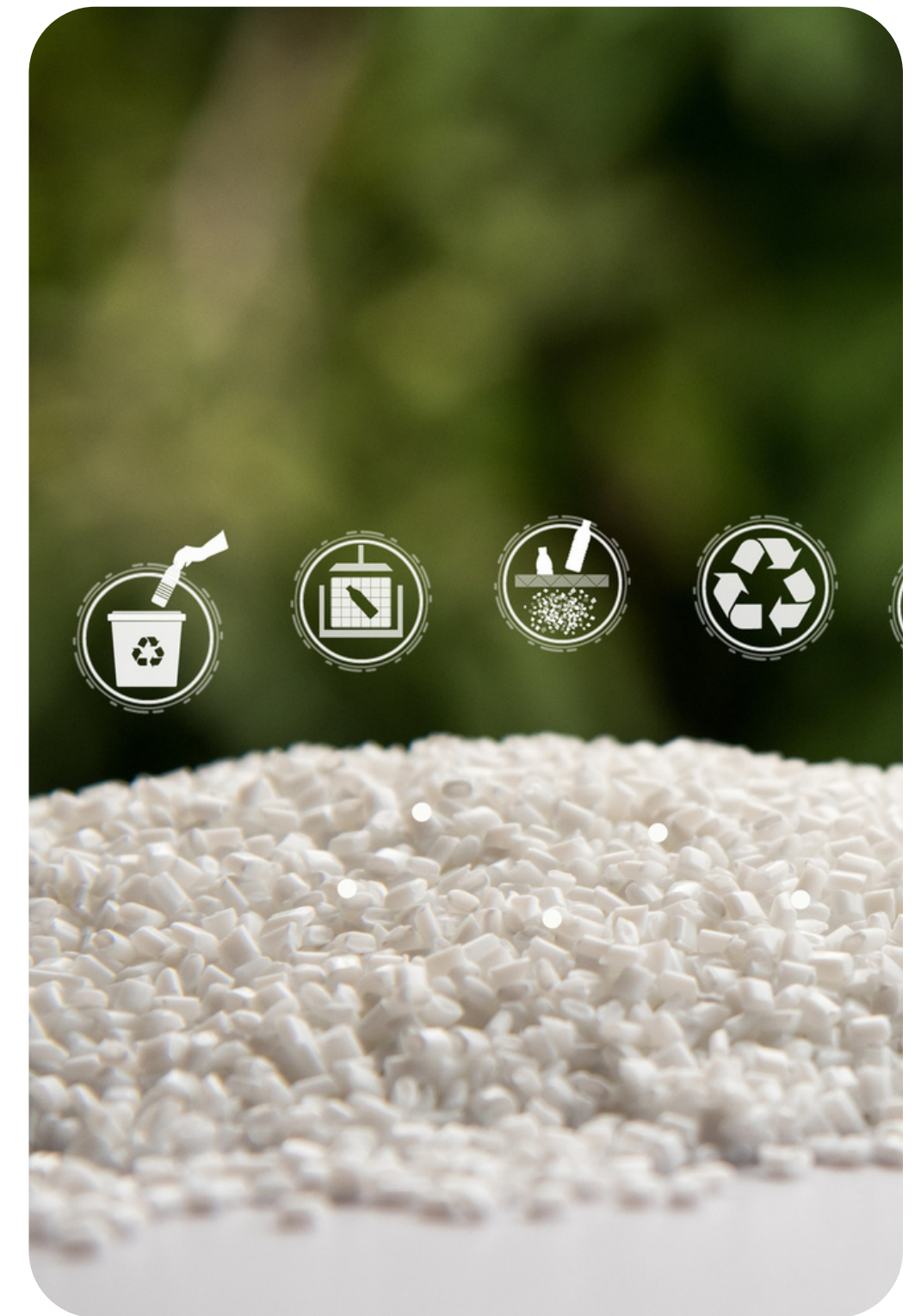


Recycle

Recycling happens when we gather different materials from an electronic product, turn them into raw materials (like the white plastic pellets in the image), and use them to create something new.

It's a great way to capture a lot of the original materials and make all sorts of useful things. For example, aluminium can be recycled completely, saving a whopping 95% of the energy needed to make it from scratch.

However, not all materials are as easy to recycle as aluminium. The process still loses some of the original energy, and there's still some waste generated.





Recover

Recover means getting back the energy used to make a product by burning it.

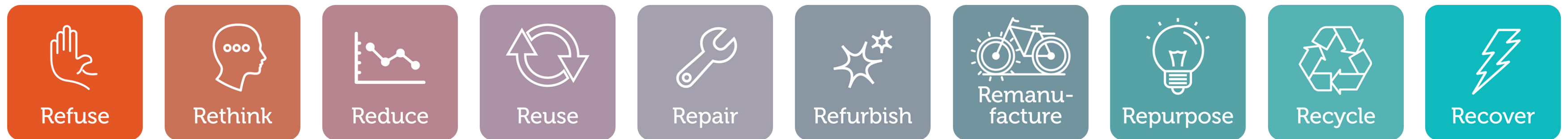
In some power plants, they burn waste to make electricity. The burning heats water, which makes a steam turbine spin to create power. After burning, they can sometimes get metals back, and the leftover ash can be used or sent to a landfill.

But here's the catch: all the work that went into making the product is gone, and this process can create air pollution and hazardous waste in the form of ash.



The Rs of Sustainability

Can you see why there are many Rs of sustainability?



None of these methods is the perfect solution to e-waste on its own. However, when we combine a range of methods, we can enhance technology production, reduce social, economic, and environmental impacts, and create a circular economy.

The perfect circular economy would be a closed loop where there's no waste, and materials and energy are reused within the system.

All it takes is individuals like you choosing to be sustainably connected.