

Circular Economy 101

Course content – external reference version

Circular Economy 101

Course content – external reference version

Table of Contents

How to use this document.....	3
Module 1 – What is a circular economy.....	4
Chapter 1.1 - The need for change	5
Chapter 1.2 - From linear to circular.....	5
Chapter 1.3 - Circular economy and climate	10
Chapter 1.4 - Circular economy and economics	17
Module 2 – From challenge to progress	22
Chapter 2.1 - The challenges of circularity	22
Chapter 2.2 - Circular economy progress and policy	25
Chapter 2.3 – From theory to practice.....	31
Module 3 – Putting circular economy into action	34
Chapter 3.2 - Five approaches of the Circularity Deck.....	34
Chapter 3.3.1 - Narrow.....	38
Chapter 3.3.2 - Slow	42
Chapter 3.3.3 - Close	46
Chapter 3.3.4 - Regenerate	49
Chapter 3.3.5 - Inform	54
Chapter 3.4 - Making and measuring progress	58
Chapter 3.5 - What's next?	60

How to use this document

This document contains the written learning content (and links to associated videos) from Sustainability Victoria's Circular Economy 101 (CE101) course series. It is shared to support learning, reference and sector capability building.

Permitted use

You may use this material for **non-commercial, public benefit purposes**, including to support learning, policy/strategy/education design, and training or other capability-building activities. The material is provided on a **non-exclusive** basis.

What you can use it for

You are welcome to use this content to:

- build understanding of circular economy concepts and approaches
- inform policy, strategy, education or program design
- support training, discussion or other capability-building activities.

Attribution and integrity

When sharing or adapting this content, please:

- attribute Sustainability Victoria (Victorian Government) as the source
- keep references to Sustainability Victoria and the Victorian Government where they appear
- ensure your use does not imply Sustainability Victoria endorsement of you or your organisation.

Videos

Course videos are available via this [playlist link](#) for viewing.

Disclaimer

This content was published on the Learning Portal in September 2025. The information contained in this document was accurate and current at the time of publication.

Sustainability Victoria will cease to operate as an entity from 30 June 2026. Accordingly, the content of this document may become outdated and should be interpreted in that context.

Management and ownership of all of Sustainability Victoria's materials, including all intellectual property rights and the granting of licence to use will be transferred to the Department of Energy, Environment and Climate Action.

Module 1 – What is a circular economy



Welcome to Sustainability Victoria's foundational course - What is a Circular Economy. Thank for joining the growing number of organisations, businesses and governments that are looking to start their journey towards a circular economy.

This short course is the first in a three-part Circular Economy 101 series, and is intended to give you the foundational knowledge and understanding needed to start addressing circularity in your organisation. The transition to a circular economy represents a systemic shift with wide-reaching impacts.

You'll learn what a circular economy is, how it differs from our more traditional, linear economy. You'll also learn about the environmental and economic benefits that come with this economic transition.

Chapter 1.1 - The need for change



Chapter 1.2 - From linear to circular



As the name implies, a 'circular economy' refers to a type of 'economy'. So, let's start there.

Reading: Linear economy



economy

/ɪˈkɒnəmi/

noun

noun: **economy**; plural noun: **economies**

1. the state of a country or region in terms of the production and consumption of goods and services and the supply of money.
"he favours tax cuts to stimulate the economy"

Looking at the definition from the dictionary, the 'economy' is about the goods and services we produce and use, and of course the money that's involved in all of that. The state of the economy is often considered synonymous with the state of a nation or country: When the economy is growing, things are going well, and vice versa. Regardless of whether this is an accurate measurement of progress and prosperity or not, the economy is something that plays a central role in our global society.

When we take a closer look at how the economy operates, it clearly revolves around the production and consumption of goods and services. The vast majority of those goods and services are delivered by taking resources from the environment, using that to make things, and when those things break or lose their value, we throw them away. Although this is a simplification, this take-make-waste mentality really is the *modus operandi* of our global economy today.



As you can see, it's a rather linear process with a clear beginning and end, which is why we can call this way of working a **linear economy**.

Examples of linear economy

As an example, consider a take-away coffee cup you might use at your local café. We would have taken stuff from the environment to make the plastic and paper used to produce the coffee cup. You'll then use it to drink your coffee, and when you're finished it will most likely make its way to a landfill somewhere. This is a fast-moving, single-use product, but the same goes for many longer-lived products.

Consider a laptop which you might use for a few years, but which will end up in the bin when you get something better and faster. Or think about a car, which might get turned into scrap after a decade of use. Or what about a building which could get demolished after 50 years, and turned into rubble? Although we employ some level of recycling or find a 'second life' for some of the materials, the vast majority of them will end up in a hole in the ground at some stage. In fact, the [Circularity Gap Report](#) estimates that 93.1% of the global economy operated in this linear fashion in 2021.

Economic activity is central to our society, wellbeing, prosperity and progress, so it's not something we'd want to stop doing anytime soon. But if we want to keep doing this linear taking-making-wasting indefinitely, there are some questions that need answering:



Where do all those resources come from in the first place? If we are continuously taking new materials from the planet, and we intend to keep doing this for the foreseeable future, is there an infinite supply to take from? And where do those materials go at the end? If we keep wasting and throwing stuff out the window, do we have an infinitely deep hole in the ground somewhere to contain it all?

Obviously, neither of those things are true, and that is where this linear economy is running into some big problems. Taking resources from the environment without check or pause means we'll eventually run out of those resources. And the drilling, mining, digging and processing we're doing to get to those resources has negative consequences for that environment. Similarly, throwing out our waste, without consideration of how it impacts the environment? That is where our toxicity and pollution come from. That is where a lot of our emissions come from. It's this way of working that is causing significant harm to the environment, the air, the land, and the water we rely upon to live and run the economy in the first place. And to make matters worse, it's like we're in a race to do that as quickly as possible; did you know that 99% of all products we purchase are thrown away again within six months?

Impacts of linear economy:

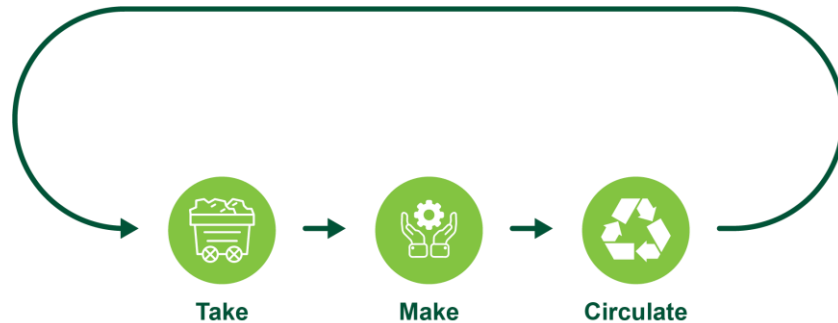
Consider some of these impacts that result from our linear way of working:

- Microplastic pollution has been detected on the summit of Mount Everest to the deepest oceans, in the very air we breathe and even in human blood.
Source: [Environmental International](#)
- Six out of nine planetary boundaries have been overshoot in 2023. This includes limits to climate change due to emissions, novel entities found in the biosphere, biosphere integrity, freshwater change, land-system change and biogeochemical flows.
Source: [Stockholm Resilience Centre](#)
- Over the past two centuries, Australia has lost more mammal species than any other continent and continues to have one of the highest rates of species decline among countries in the Organisation for Economic Cooperation and Development (OECD).
Source: [DCCEEW \(Australia State of the Environment 2021\)](#)
- Ambient (outdoor) air pollution in both cities and rural areas was estimated to cause 4.2 million premature deaths worldwide per year in 2019.
Source: [Source: World Health Organisation](#)

This paints a rather dire picture, highlighting the importance of doing things differently. As the name of this course suggests, the answer lies in transitioning this *linear* economy into a *circular* one. Research and practice from around the world has shown that a circular way of working holds incredible promise to reduce these negative impacts, but also create opportunities for new ways of doing business. We'll unpack all of that in this course, starting with an overview, next.

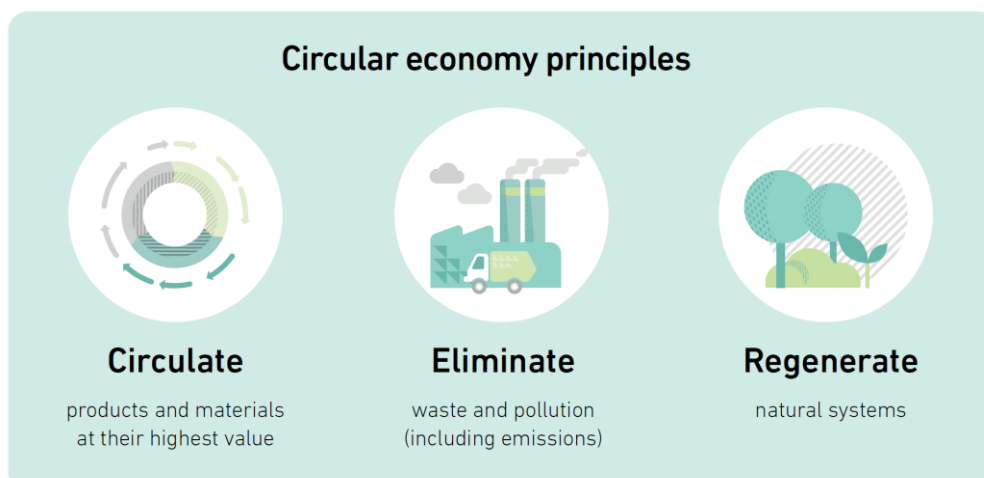
Reading: Circular economy

In essence, a **circular economy** tries to offer an answer to the questions marks in our linear economy. By connecting the end and start of the linear system together, we end up with a closed-loop system.



In a closed-loop system, resources that make their way to the end of the line are circulated back to the start through a variety of strategies such as reuse, repair and recycling. Waste effectively disappears from the picture, because it is circulated into a new resource instead. When these resources re-enter the system again at the start, they replace the new materials that would have needed to be extracted from the environment. This is how a circular economy gets rid of those two question marks of the linear economy, changing the take-make-waste system into a take-make-circulate system instead. In its most basic form, this is all a circular economy is, a closed-loop economic system.

The detailed benefits, impacts and challenges of transitioning to this new, circular economy will be addressed later in the course, but it's important to acknowledge that this seemingly simple change represents an entirely different way of running our economy. As we've learnt at the start, the economy is about the goods and services we produce and use, and everything that we do to make that work. So naturally, the transition to a circular economy will have an impact on everything we do to make that work as well. This means that circularity is about recycling and waste management, but it is also about design and manufacturing. It is about logistics and business models, consumer behaviours and finance, it is even about regulation, policy and legislation. Everything that is somehow related to the way our economy operates – so almost everything we do – will be impacted by the transition to a circular economy. It represents a system in which all these different elements need to work together, which can quickly become an overwhelming aspiration that appears too broad for meaningful action. To help simplify things, consider these three principles that underpin what drives a circular economy:



We want to keep circulating products and materials at their highest possible value, which is how we maintain a closed-loop system. When done right, that's how we can eliminate waste and its negative impacts such as pollution and emissions. Waste is what happens when resources fall out of the closed-loop system, so we want to avoid this as much as possible. That allows us to create an economy where we can still build the things we need in society today, but do so in a way that enables the regeneration of the environment and other natural systems.

Systems thinking:

A phrase you'll hear us use a lot throughout this course is 'a circular economy represents a systemic shift', so what does that mean, exactly? As we've seen in this chapter, the transition to a circular economy will have an impact on most – if not all – aspects of our economy. The three principles of *circulate*, *eliminate* and *regenerate* offer a rule-of-thumb on what underpins these impacts, but we're still talking about something that requires collaboration across all parts of the economy. One party's waste needs to become another party's resource; Those who produce things need to collaborate with those who use them to make sure the loop is closed; Material extraction needs to be mindful of local ecosystems', etcetera. All parts of the system need to work together if we are to make this circular thing work, which is what we mean when we speak of the 'systemic nature' of the circular economy. Because of this, the discipline of *systems thinking* plays an important role in the circular transition.

The University of Cambridge has written about systems thinking to help demystify what that means and how it's applied, or consider watching this video from the [Monash Sustainable Development Institute](#) on how it works in a circular economy.

Transitioning to an alternative economic model is a big task, but as you'll learn in this course, it's very much a necessary one. We'll continue by elaborating on the link between the circular economy and climate, how it makes financial sense, but also what the challenges and our current progress look like. Afterwards, we will give you the building blocks you need to start putting circularity into action.

Further reading

The transition to a circular economy represents a systemic shift in the way we do things. Simplifying what that means and putting it into a neatly organised set of videos and texts can only go so far without losing nuance and detail. Some readers might benefit from further reading about the intricacies of circularity, so consider some of the links below to learn more.

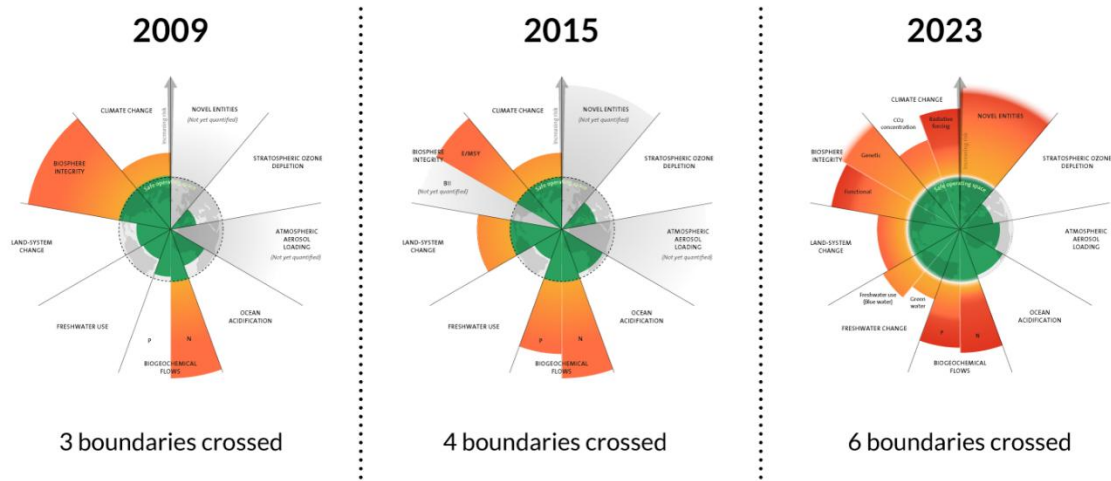
- Consider [this article by the Ellen MacArthur Foundation](#), doing a deep dive on the systems thinking and mentality shifts that underpin the circular economy.
- Circularity as a concept can be considered an integral part of alternative economic thinking, such as in [Kate Raworth's Doughnut Economics model](#). Consider reading Kate's 2017 book of the same name to explore seven ways to think like a 21st century economist.
- From an academic perspective, circular economy builds on a large body of systems ecology literature from the 1960s and 70s. A lot of this literature is rooted in concerns about the environment and finite resources, which eventually drove the World Commission on Environment and Development to create the [Brundtland Report in 1987](#), which still shapes the global agenda on sustainable development today.
- Consider exploring ideas and concepts such as [Cradle-to-Cradle thinking](#), [Industrial Ecology](#), and [Performance Economy](#) to learn more.

Chapter 1.3 - Circular economy and climate



Reading: Emissions

The way that our economy operates is directly linked to climate change. The creation of goods and services in our predominantly linear economic system is causing emissions, pollution, toxicity and many other **negative externalities** that have led to us overshooting six out of nine measured planetary boundaries.



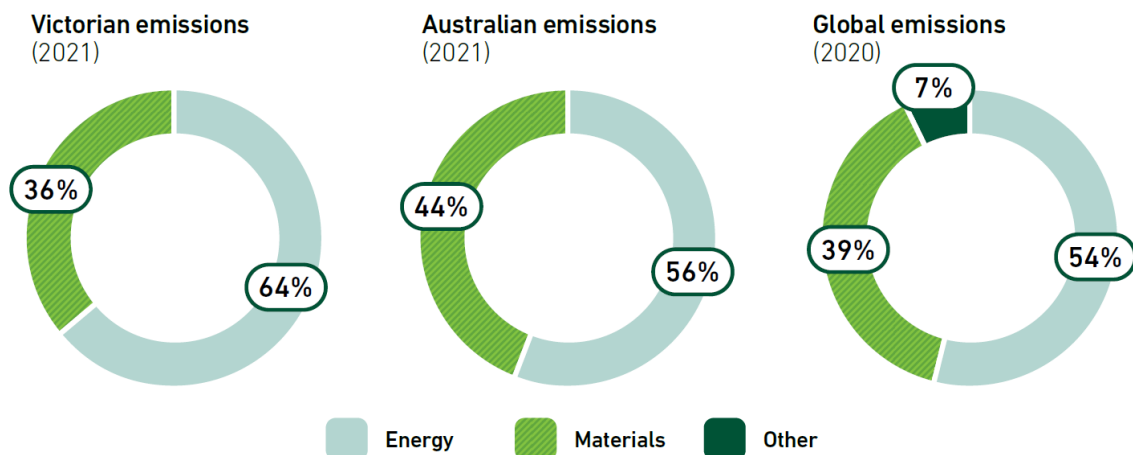
Planetary Boundaries:

The planetary boundaries represent a set of nine processes that regulate the stability and resilience of our planet's environment, when you consider the Earth as a system. Scientists at the Stockholm Resilience Centre and the Australian National University quantified at what point any changes to these processes would lead to abrupt or irreversible environmental changes. The most recent measurement in 2023 shows that six out of nine of these limits – or boundaries – have now been exceeded. Learn more about this framework through the [Stockholm Resilience Centre](#).

The main antagonist in the climate change conversation is **greenhouse gas** emissions. In Victoria, achieving net-zero emissions by 2045 is a legislated target, and with good reason. The science is undeniable about the need to reduce emissions, because they are the primary cause of accelerated global warming. This has led to the United Nations reaching a breakthrough agreement on 12 December 2015: the historic Paris Agreement. This Agreement sets long-term goals to substantially reduce global greenhouse gas emissions and hold global temperature increase to well below 2°C above pre-industrial levels.

To help inform action, it's important to understand where emissions come from. Greenhouse gas emissions represent a group of various gasses such as carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O), each with its own level of impact on the greenhouse effect. Some are created by the burning of fossil fuels and the use of non-renewable energy. Another common source is the use of vehicles, causing tailpipe emissions. But did you know that the extraction and use of materials also produces emissions? The production of concrete, steel and plastic, the growth of food crops, and the management of our waste are all sources of emissions. In fact, our research shows that about a third of Victoria's total emissions come from materials.

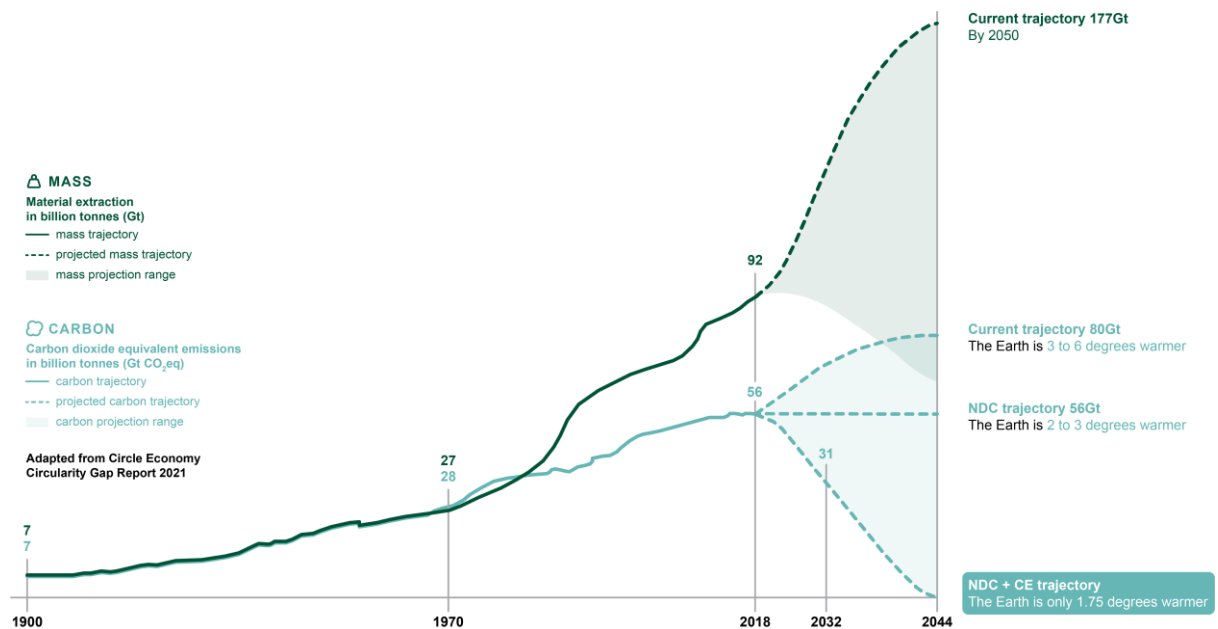
You can learn more about where Victoria's emissions come from here.



This is important to note, because the variety in emission sources also means we need to consider a variety of solutions. Going all in on the use of renewable energy – think installing large numbers of solar panels and wind turbines, upgrading the electricity grid accordingly, and investing in electric vehicles everywhere – would only partially get us to our net-zero target. If we want to get to the level of emissions reduction that is needed, we also need to address those material-related emissions.

Material-related emissions are created by using heavy machinery to dig resources out of the ground, processes to refine resources into a usable form, through waste management processes, food production, and various other ways. In a circular economy, we keep materials in use for as long as possible which reduces the need for the extraction of new materials. Reusing, repairing or recycling materials requires less effort than extracting and creating new materials, and a reduction in waste also reduces waste-based emissions. This is why the transition to a circular economy is so important in the race to reduce emissions, and the climate change discussion overall.

In fact, research by Circle Economy in 2021 suggests that the only way we are going to stay below the 2°C global warming limit specified by the Paris Agreement, is to adopt both the Agreement's recommendations (the NDCs, or Nationally Determined Contributions) AND a circular economy:



Read: Material scarcity

Another issue that circularity will offer answers to is the fact that we're physically running out of materials. Right now, this mainly applies to **critical minerals** such as cobalt, iridium and copper, but the longer we keep doing things in a linear way, the more resources will simply run out. There is no magical, infinite supply of anything, so the unchecked 'taking' that we are currently doing will result in most materials running out eventually.

An organisation called [Earth Overshoot Day](#) keeps track of how much the planet can sustainably provide each year, and on what date we have overshoot that capacity. The graph shown here illustrates that when they started keeping track in 1971, we were running about break-even; we used about as much resources as the planet was sustainably able to provide in one year. But as you can also tell from that same graph, that date has been dropping ever since. In 2024, Earth Overshoot Day fell on August 1st, which implies that we'd need 1.7 Earths to sustainably provide the materials we use every year.

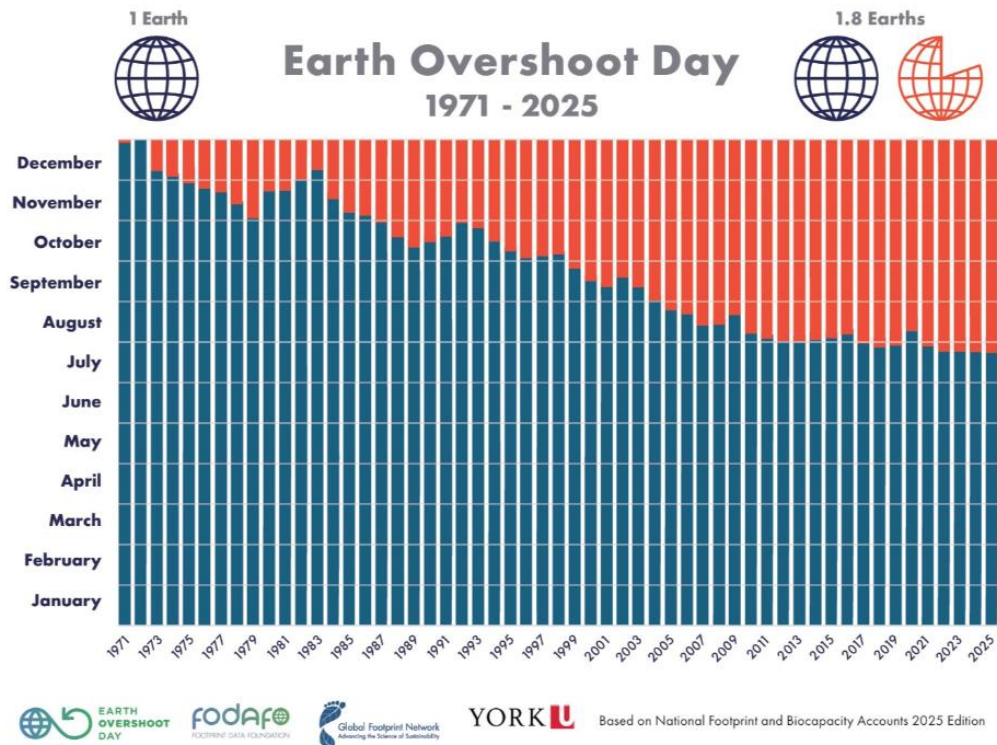


Image: Date of overshoot day from 1971 - 2025. From [source](#).

But a global figure like that is an average that includes a lot of extremes in either way. They also calculate individual Country Overshoot Days, with Australia landing on March 19th in 2025. This means that if everyone on Earth were to consume resources like we do here in Australia, Earth Overshoot Day would fall on March 19th, not August 1st. That consumption behaviour would require more than four planets to sustain. This proves that our linear way of working is eating into our material reserves at a rate that is simply not sustainable.

Country Overshoot Days 2024

When would Earth Overshoot Day land if the world's population lived like...



Image: Occurrence of overshoot day by country. Source.

The transition to a circular economy means switching to a closed-loop system where materials are kept in use rather than thrown away. This results in a reduced need to take new resources from the environment, making it our best shot at bringing material consumption back into sustainable limits.

Another element to consider here is the importance of supply chain security. The COVID19 pandemic has taught us that the disruption of global supply chains can have long-lasting consequences for smaller, domestic markets. Aside from reducing the need for new, virgin materials, another core tenet of a circular economy is to produce things locally where possible. Also consider that a closed-loop system implies that a minimal amount – ideally, none – of resources will fall out of the system as waste, which means that everything that is imported will remain in the domestic economic system to be reused, re-mined or otherwise ‘scavenged’ for materials. Once matured, a circular economy will have a positive impact on supply chain security because of this.

Consider [this article from the World Economic Forum](#) to learn more about how circularity strengthens supply chains.

Read: Biodiversity

A crisis that might become more critical and damaging than global warming in the short-term future is biodiversity loss. As described by the [World Wide Fund for Nature](#), biodiversity underpins the health of the planet and has a direct impact on all of us. The loss of biodiversity can lead to land degradation, changes in farming and food productivity, water supply and pollution breakdown, and even climate stability and recovery from natural disasters. So, it's important to understand that material extraction and processing is responsible for 90% of biodiversity loss, according to the [UN Environment Programme](#) and the [International Resource Panel](#). Drilling, mining and polluting the environment to obtain the resources we want obviously doesn't do wonders for flora and fauna.

In a circular economy where materials are circulated again and again, the need to extract new resources drops, which will naturally have a positive impact on flora and fauna affected by material extraction and processing. A study done by the Finnish Innovation Fund Sitra has found that the

transition to circularity would fulfill 30% of the progress needed to stop and even improve upon biodiversity loss.

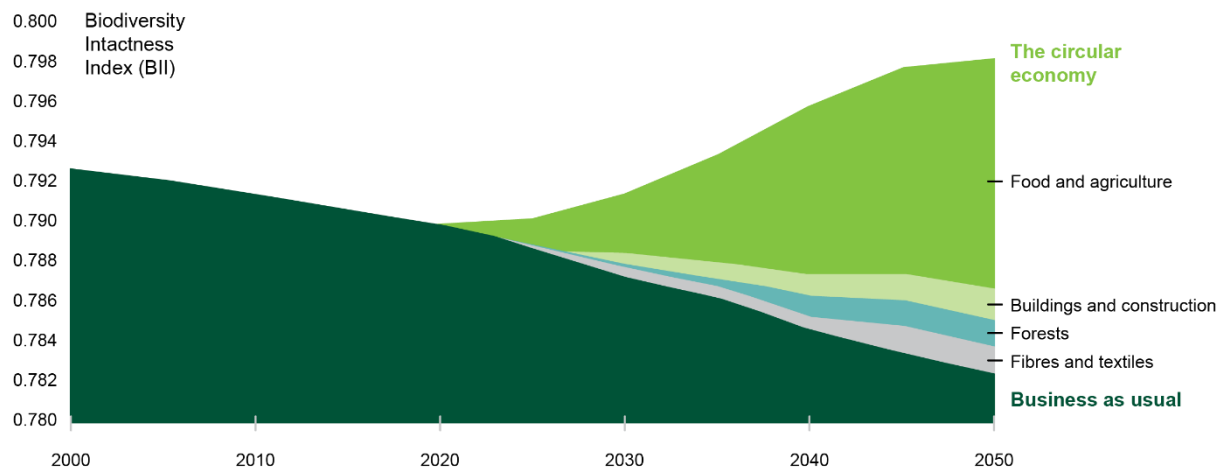


Image: Comparison of biodiversity intactness over time across industry. [Source](#)

Especially in the food and agriculture sector, which relies on changing large areas of land, circular interventions can have an incredibly positive impact. Sitra's study suggests that the shift to alternative proteins and regenerative agriculture, and reducing food waste by half, could halt biodiversity loss by 2035.

Case study: Where is CE reducing carbon footprint?

One area of Australia that has embraced the incredible potential of a circular economy is the Bega Valley. Led by the food company Bega Group, the valley is attempting to become Australia's most circular economy, with many of the businesses and community members in the valley convinced of the benefits it offers. Organised under [Bega Circular Valley](#), various organisations and businesses are finding alternative uses for their waste, reducing their emission footprint, and improving the resilience of the area against natural disasters.

The following video from ABC illustrates how Bega is embracing this new way of working.



Video: State of Sustainability

Our knowledge of sustainability-related matters in Victoria is supported by various key research pieces. One such core research program is our State of Sustainability project, to track the attitudes, beliefs, and behaviours of Victorians on sustainability. This program builds on previous social research and continues our longstanding commitment to understand the drivers and barriers to living more sustainably.

In this video, our Social Research Lead Dianna McDonald talks you through this signature research piece and highlights some key insights that relate to the circular economy.



Chapter 1.4 - Circular economy and economics

Video



Read: The real cost of linearity

So far, the benefits that we've discussed of the transition to a circular economy are largely environmental. The relationship between circularity and climate change highlights the necessity of embarking on this transition, but ultimately, we are talking about an economic system. If an economic system is going to work, the economic benefits need to stack up as well.

There are a multitude of reasons for why we are currently embracing a linear way of working. Arguably, it is a reflection of the modern, post-war world, where economic recovery has evolved into consumerism and finding the cheapest and most efficient way to sell things. With advances in technology and consumer access to goods and services, mass-produced products are now cheaper than ever before. In today's market, we are able to purchase a huge selection of items, gadgets, toys, and paraphernalia on the internet for next to nothing. Shipping is usually free, and a lot of stuff is even given away for free with other purchases. The linear economy might just be a result of our relentless pursuit of efficiency, right? However, when we dive a little bit deeper, it becomes clear that many parts of the linear economy are really an incredible waste of money.

Textiles and fashion

The World Resources Institute estimates that global textile production uses almost 100 billion cubic meters of water each year, which is approximately 4% of global freshwater withdrawal. That's a big price to pay, but despite that people throw away still-wearable clothes worth an estimated US\$460 billion each year. This video from The Economist explains the true cost of fast fashion in more detail.



The
Economist

THE COST OF FAST FASHION

Food waste

The [United Nations' Food Waste Index Report from 2024](#) shows that, on average, each person wastes 79kg of food each year. That's equivalent to at least one billion meals of edible food being waste in households worldwide every single day. Just managing that amount of waste is costing us more than US\$1 trillion, annually.

We shouldn't forget that throwing our waste into the bin is not free. Waste and landfill levies are rising to manage the growing cost of waste management. In [Victoria](#), the waste levy has grown significantly over the last few years, sitting at almost \$170 per tonne for municipal waste in metro areas since 1 July 2025. And that is global trend, according to the [UN's Global Waste Management Outlook report](#). This report estimates that in 2020, the cost of managing our global municipal solid waste was about US\$360 billion. But for 2050, that estimate grows to a whopping US\$640 billion. Even if we were to embrace recycling practices to get our growing waste volumes under control, the UN estimates for the cost to still be around US\$270 billion. Perhaps unsurprisingly, the transition to a circular economy offers a different outlook altogether:

Figure 25: Overall cost of global waste management under the three scenarios (US\$ 2020).

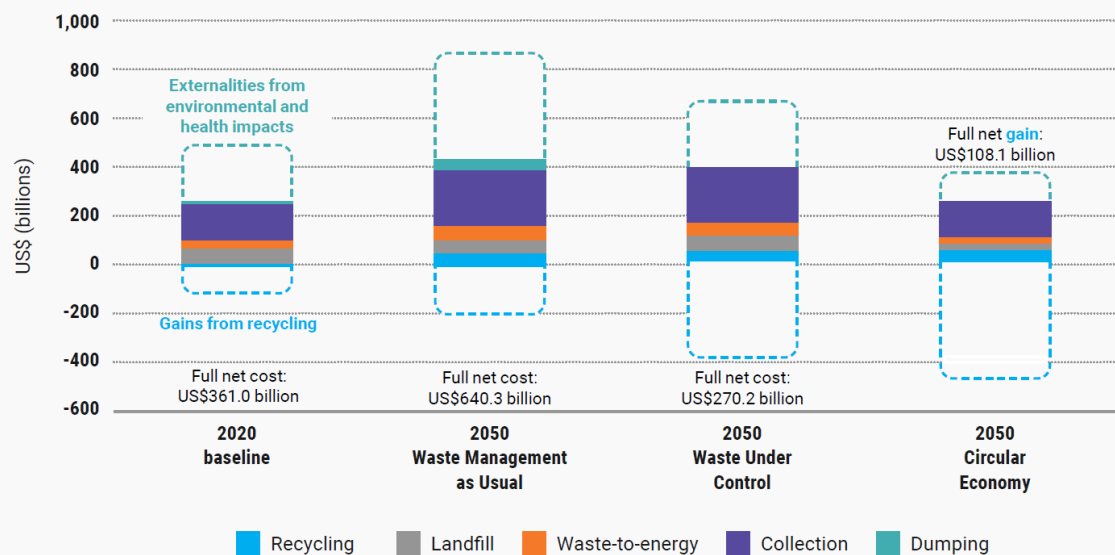


Figure: Cost of global waste management under different scenarios. Source:

Instead of just reducing the cost of waste, transitioning to a circular system is expected to result in a net gain of more than US\$100 billion. This shows how a circular future is the only future in which any of this makes financial sense. Keeping materials and products in use, eliminating waste by using it as a resource, reducing pollution and toxicity, and regenerating our natural environment are all activities that will result in economic gains.

Fossil fuel subsidies

The consumer products flooding the market at impossibly cheap prices are the result of linear efficiency and economies of scale, right? But are they really?

In a lot of cases, the financial viability of a lot of linear products is being artificially propped up by hidden subsidies. A good example is the pervasiveness of global fossil fuel subsidies. Although renewable energy from solar and wind is clearly the cheapest form of energy, businesses in that sector still struggle to compete with tradition fossil fuel-powered solutions because the latter are disproportionally supported by subsidies. This has flow-on effects for a lot of material sectors as well, such as the plastics industry.

A study by the International Monetary Fund concluded that global fossil fuel subsidies in 2020 totalled US\$ 5.9 trillion, expected to rise further by 2025. If a clear picture of all such 'hidden' subsidies would be available, it is likely that they'd change the financial viability of many linear solutions.

Read: Circular opportunities

The opportunities created by the transition to a circular economy don't stop with just waste management. Keeping materials in use and eliminating waste from the system requires changes in business models that enable some exciting opportunities for innovation and economic gain.

Repair services

For example, a circular business strategy that is becoming more common is the creation of a repair service for goods that are sold. Examples of this strategy in action include Remote Equipment Repairs, Patagonia and Nudie Jeans, businesses that all offer repair services.

Offering customers the ability to get their purchases repaired creates additional touch points that can lead to improved customer retention and longer-term relationships with those customers. Moving from a single customer transaction at the point of sale to multiple transactions through repair, reuse or refurbishment creates a lot of opportunity for improved engagement.

Organisations including KPMG, the Ellen MacArthur Foundation, Accenture, Beyond Zero Emissions, CSIRO, Charitable Reuse Australia and NSW Circular have all done studies to estimate what this economic opportunity looks like, globally and for Australia. Their estimates are promising:

- The transition to circularity represents an economic opportunity of \$23 billion by 2025, growing to \$210 billion by 2048 for Australia. Globally, circularity could generate US\$ 4.5 trillion of additional economic output by 2030, and as much as US\$ 25 trillion by 2050.
- Decarbonisation initiatives could add over 200,000 new jobs to the Australian economy. A circular food, transport, built environment, manufacturing and recycling sector would enable some 150,000 ongoing jobs over the next few years already. Renewables and low-emission project can deliver 1.8 million new jobs in Australia's regional areas, many of which are focused on the transition to a circular economy.
- Recycling is estimated to be able to provide 3.3 jobs for every job in landfill. And reuse is estimated to generate 25 more jobs than recycling again.

Regardless of the range of estimates provided by these studies, they all agree that the transition to a circular economy will unlock significant economic benefits in the future. And beyond these financial gains, the transition to a circular economy promises increased supply chain resilience, improved customer relationships, and a platform for innovation. New business models come with new opportunities. New goods and services come with design and manufacturing innovation. And a new economy is in need of new skills and talent.

Case study: Where has CE made business sense?

Signify

Signify is a Dutch multinational lighting corporation, formed in 2016 as a result of the spin-off of the lighting division of Philips. Their lighting division was bringing in a lot of revenue and Signify got evaluation at \$3.4 billion in 2016. As a business experiment, they developed a lighting-as-a-service model where they would manage not only the sale of lighting products, but also the installation, management and decommissioning of these products, through something similar to a subscription model. This allowed Signify to develop more efficient solutions and adopt a circular approach to enabling lighting for their customers. Although this was very much a circular experiment, Signify managed to grow to almost US\$ 8 billion in revenue and 35,000 employees in over 70 countries in 2022. This is an example of how circular ways of doing business can lead to some pretty significant gains.

Nudie Jeans

Swedish denim brand Nudie Jeans were one of the first jeans retailers to also offer a repair service for your jeans, free of charge. In 2003, they started with just of US\$10 million in revenue and 12 employees. In 2019, they were bringing in more than five times as much at US\$ 51.7 million and grew to almost 200 employees worldwide. It's proof that a circular business that offers repair services, even when they're completely free to the customer, can do very well, economically.

Fungi Solutions

Victoria-based Fungi Solutions is a great example of how circular business practices have led to innovations opening up new material streams and markets. The biotech start-up uses fungi to recycle and transform organic waste into sustainable circular packaging solutions. After use, the mushroom-

based packaging can be returned to the earth in the form of compost, improving soil health. Fungi Solutions have won the [2022 Premier's Sustainability Awards - Recognition Award](#), and they are even training mushrooms to thrive on toxic waste such as cigarette buds. Find out more about this innovative business in [this video](#).

Module 2 – From challenge to progress

Welcome to Sustainability Victoria's second of our three-part Circular Economy 101 series – From challenge to progress. Thank you for continuing your journey towards a circular economy, alongside a growing number of organisations, businesses and governments across Australia.

This short course is designed to help you understand where circularity stands today. While the benefits of a circular economy are clear, the path to achieving it is complex and still emerging.

You'll explore the challenges that are slowing progress, learn where circular action is gaining momentum, and discover how policy, collaboration and innovation are shaping the future of circularity in Victoria, Australia and beyond.

Chapter 2.1 - The challenges of circularity

Video



Read: Why aren't we there yet?

With the benefits and opportunities highlighted in the previous sections, a fair question would be: 'why aren't we there yet?' If the need to transition to a circular economy is so dire, and if the evidence is there to suggest that we'll benefit from doing so, what is holding us back?

Arguably, the biggest reason for this is as simple as it is pervasive: circularity, as a concept, is new. *Circular economy* is an idea that builds on a lot of established systems ecology literature from the past 50 years or so. But when it comes to implementation, momentum has only really picked up in the last 15 years. For something that is proposing systemic changes to our economy, that is not a long time; According to [Circle Economy's Circularity Gap Reporting Initiative](#), *circular economy*, as a term, has only reached megatrend status since the start of 2024.

Because it is relatively new, circularity is poorly understood. Our [State of Sustainability](#) research concludes that about two thirds of Victorians don't really understand what the term 'circular economy'

means, and that 38% of Victorians have never even heard of it before. [Research done by the Australian Circular Economy Hub](#) suggests that while industry awareness of the circular economy appears high, knowledge is moderate. Similarly, [research done by the Victorian Circular Activator](#) highlights that a lack of understanding is one of the primary challenges in transitioning to circularity. Naturally, this means that we are simply not yet as effective as we could be in embarking on this transition.

Our current, linear way of working tends to be siloed, with a clear reluctance to be transparent about information and performance data. Adopting a systemic approach where different parts of the economy need to work closely together is made difficult by this lack of transparency. Combined with the aforementioned lack of understanding, the result is that we do not yet have a clear roadmap towards a circular economy. There is no clearly defined goal or vision, a lack of detailed metrics, and policy and legislation are lagging behind.

One might nominate governments as the clear party responsible for turning this list of cascading causes and effects around, but action from industry and the community is just as important. We've operated in a linear fashion for a long time, so businesses have naturally adapted to these circumstances.

Consider the impact of some of these examples:

- Financial systems are set up to support investment in extractive processes. When you decide not to worry about a project's impact years down the track, it becomes easy enough to focus solely on the short-term benefits. The pay-off of circular solutions tends to be long-term, so investment opportunities are naturally drawn to linear, extractive processes that offer a quicker return on investment. Consider the [work of the Taskforce on Nature-related Financial Disclosures](#), which intends to change this vicious cycle.
- Many negative externalities are not costed or included in product pricing. Although the production of many products causes emissions and pollution, affects biodiversity or simply causes harmful waste upon littering, these impacts are usually not reflected by the purchase price of the product. The price of a single-use coffee cup does not reflect the cost of its impact on the environment, or the cost of cleaning it up if it gets littered in the bushes. These impacts are examples of *negative externalities*, and when they are not costed into the product's price, it can make linear products look cheaper than they really are. This makes it difficult for circular solutions to compete on a level playing field. Check out [this article from the International Monetary Fund](#) to learn more.
- The development of large infrastructure tends to have a large cost attached to it. This is true for building roads, bridges, and office buildings, but also things like waste incinerators or landfills. For this reason, the return-on-investment period of large infrastructure is long which prevents quick changes from being made without a huge loss of capital. Effectively, this means that landfills and other linear infrastructure are locked in for a long period of time, despite being incompatible with a circular economy and our desire to make changes. This [report from the Green Building Council of Australia](#) shows how our linear way of construction is wasting materials and therefore also a lot of money.

When you combine all the elements discussed in this chapter, you might agree it creates a situation where doing circular business can be risky and simply not always financially viable in the short term. Our economy is set on a self-reinforcing trajectory with a strong inertia that resists change. It is important to be aware of these challenges and acknowledge the complexities of transitioning our economic system from a linear to a circular one.

But every single one of these challenges also represents an opportunity for innovators, early adopters and pioneers in the circular economy. The systemic nature of circularity might create complexity, but it also creates a platform for anyone, in any sector, and with any background to work on solutions.

In the next chapter, we'll take a look at some of the things that are happening to shift the dial.

Activity: Circularity in the past

Although the implementation of a circular economy at scale appears to be a relatively new concept, did you know that it isn't, really? In fact, it's our linear way of working that is the new kid on the block, tracing its roots to the industrial revolution. Many of us are familiar with stories from grandparents talking about keeping that same sweater repaired for years, using every last little bit of a butchered animal, or having sat in the same armchair for decades. These are examples of when consumerism and wasteful linearity were still new ideas. And a lot of these old practices are actually perfectly circular.

Can you think of any stories or examples of circularity in the past, when it was simply accepted as common practice?

Chapter 2.2 - Circular economy progress and policy

Video



Read: Global progress

The global push towards a circular economy has gained significant momentum in recent years as nations, businesses, and communities recognise the urgent need for the sustainable management of our resources.

Japan was the first country to develop a national Circular Economy Vision in 1999, but the European Union is leading the charge when it comes to momentum in this space. Most notably, they have adopted The European Green Deal, which specifically aims to decouple economic growth from increased resource use through circular practices. The European Commission adopted their first circular economy action plan back in 2015, which has since been bolstered by all kinds of legislation on matters such as the right to repair, making claims about environmental benefits, and monitoring frameworks. Individual European countries are also making progress. For example, the Dutch and Finland both adopted national circular economy plans and roadmaps in 2016.

Stocktake of circular economy roadmaps:

Chatham House, with support from UNIDO, conducted the first global stocktake of national circular economy roadmaps in 2024. Their work offers insights into 75 national circular economy 'calls to action', 'roadmaps' and 'operational strategies', representing 2882 individual actions to progress the transition. As shown in the graph here, we've seen a significant boom in the number of these publications since 2016.

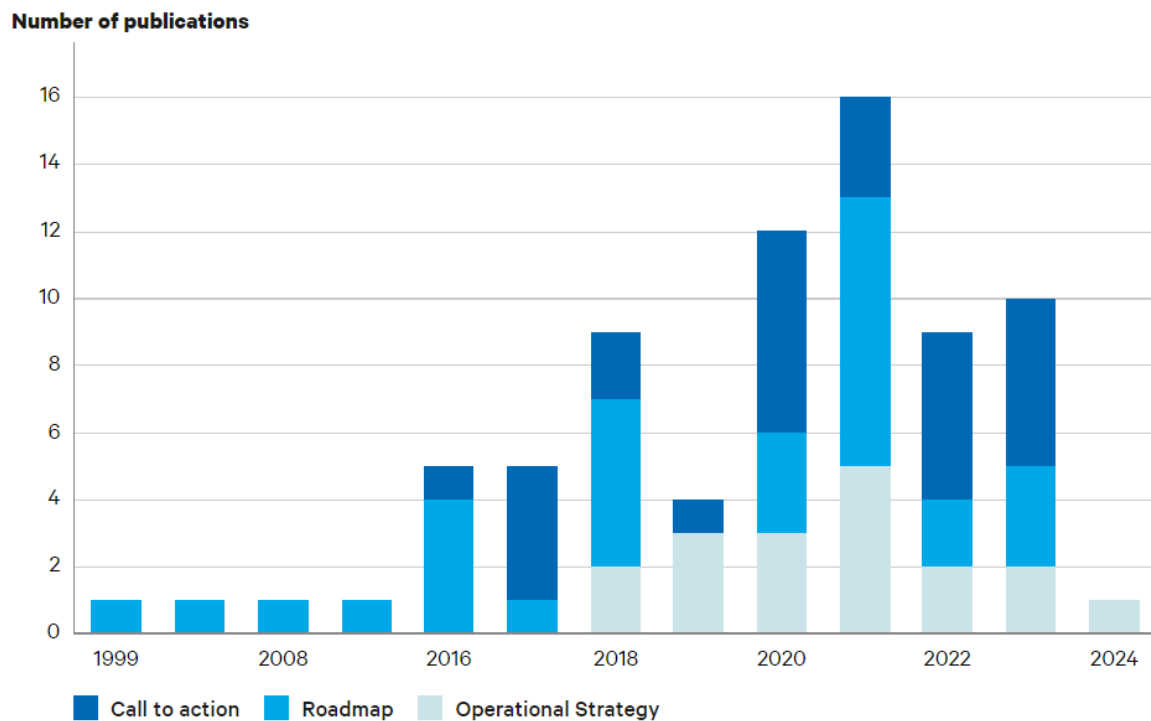


Image: Number of Circular Economy publications over time. Source: [Circular Economy Publications](#)

The growing, global momentum in circular action is further catalysed by the [World Circular Economy Forum](#). Organised annually by the Finnish Innovation Fund, Sitra, the Forum is hosted by countries all over the world to bring business leaders, policymakers and experts together to work on circular solutions. This includes Finland, Japan, the Netherlands, Canada, Rwanda, Belgium, and will be held in Brazil in 2025.

But there is still more progress to be made.

Even though circular progress has accelerated enough for [circular economy](#) to become a megatrend, there is still not yet sufficient coordination and collaboration across governments and systems on the transition. This is reflected by some key statistics, showing [Europe's material use to be only 11.8% circular](#), and our global material use to sit at [6.9% circularity](#).

The trend is pointing in the right direction, however. This is supported by bold action by the European Union: In 2022, the European Commission proposed [new rules on packaging and the use of labels that promote reuse and recycling](#). In 2024, EU consumer rules were updated to ban greenwashing, and the [European Commission will mandate businesses to adopt the European Sustainability Reporting Standards \(ESRS\)](#) as part of their Corporate Sustainability Reporting Directive, with circularity becoming a key part of the disclosure process. This trend is expected to continue, which will have an impact on the global market as well.

Read: Australian progress

Although Australian progress on the circular economy is somewhat lagging behind the European early adopters, we are quickly catching up. Especially in the last couple of years, Australia is experiencing a profound shift in embracing the opportunities enabled by a circular economy through better design, manufacturing, business models and consumption behaviours.

Prior to this, however, [circular economy](#) was a topic of discussion mainly in waste management departments and organisations. The [Australian waste market was significantly impacted by the](#)

Chinese Operation National Sword policy initiative in 2017, banning the export of certain wastes to Chinese markets. The required restructure of Australia's waste management and resource recovery sector led many governments to consider circularity as a response. As a result, most of Australia's first circular economy policies and strategies had a limited focus on waste management. Even today, many circular initiatives are still led by government waste departments and agencies.

Waste-focused circular economy policies in Australia

The circular economy landscape in Australia is changing rapidly but its roots lie in waste management, which is reflected by policy:

- Victoria's circular economy policy evolved from a recycling-focused policy, called Recycling Victoria;
- The Northern Territory Circular Economy Strategy is the NT Government's plan to reduce, reuse and recycle waste into a valuable resource;
- Queensland is implementing circular economy principles through its Waste Management and Resource Recovery Strategy;
- The ACT started with a Waste Management Strategy, before developing a dedicated Circular Economy Strategy in 2023;
- Western Australia's vision to create a circular economy is embedded in their Waste Avoidance and Resource Recovery Strategy;
- Similarly, Tasmania is working to achieve a circular economy, as proposed in the Tasmanian Waste and Resource Recovery Strategy;
- And NSW is evolving their circular economy policy, but still hints at the waste-focused roots of that work through the 'Too Good To Waste' policy statement.

But policy developments over the last couple of years are showing a strong shift towards a more holistic interpretation of circularity. For example, Australia now has an official Circular Economy Framework, providing clear guidance around our circular priorities. This builds on the advice from the Circular Economy Ministerial Advisory Group (CEMAG), created in February 2023. Australia's Circular Economy Framework and CEMAG's final recommendations report both push for ambitious action such as creating national targets and indicators, developing circular design principles, and supporting a workforce capable of building our circular future.

This national progress is further supported by research from various organisations. The not-for-profit Australian Circular Economy Hub tracks the state of circular economy thinking in the Australian business community, for example. And Australia's national science agency, the CSIRO, engages in cutting-edge research to develop material-specific roadmaps for a circular future, a marketplace to match business with potential remanufacturers, and even a comprehensive quantification of how materials flow through the Australian economy.

The CSIRO's calculations reveal that the Australian economy is 4.6% circular, with a target to double that by 2035. In line with the global situation, momentum towards more circular action is clearly building, but the statistics haven't quite caught up yet. We'll likely see this number shift as collaboration and coordination improve over the years to come.

Australia is quickly catching up to the circular pioneers in Europe, developing more holistic policy and going all-in on circular initiatives.

Watch this video from Global Australia to see how Australia is investing in the circular economy right now, to achieve a more sustainable economy in the near future.



Read: Victorian progress

Like other jurisdictions in Australia, Victoria's first movement towards a circular economy was initiated with a focus on waste and resource recovery. Partially due to the Operation National Sword policy initiative, Victoria's recycling sector found itself in dire straits in 2018. As a response, the Victorian Government launched the [Recycling Victoria: A new economy](#) policy in February 2020. Supported by more than \$300 million in investment, the policy includes a plethora of initiatives to grow the Victorian economy, create 3,900 jobs and protect the environment towards 2030.

The policy includes waste-focused initiatives such as a new household waste and recycling system, a container deposit scheme, and investment in priority recycling infrastructure. But over time, this policy has evolved more and more into a circular economy policy, banning the use of certain single-use items, creating regional circular economy plans, and laying the foundations for Victoria's transition to a circular economy.

[Read about the policy and what we've achieved so far here](#), including more than a million tonnes of new waste and resource recovery capacity and \$84 million in grants for more circular solutions.

Victoria's circular economy-related initiatives and policies have evolved quickly over the last few years, so there is a lot to keep track of. Have a look at the timeline here which outlines some of the major developments since the Recycling Victoria policy was introduced.



Image: Timeline of circular economy developments since 2018

Looking ahead, the Victorian Government is increasing its focus on our transition to a circular economy. *Circular economy* is one of the five priority sectors flagged by the [Economic Growth Statement](#). The term *circularity* is now also a key part of the strategic directions of the [Department of Energy, Environment and Climate Action](#), the [Recycling Victoria](#) agency, as well as [Sustainability Victoria](#). In early 2024, Sustainability Victoria refreshed its Strategic Plan, outlining how Victoria will be the leading circular economy in Australia by 2027.

This growing focus on the transition towards a circular economy is supported further by departments and agencies outside of the environment portfolio, such as [Infrastructure Victoria](#), the [Department of Jobs, Skills, Industry and Regions](#), and many others. This is indicative of the Victorian Government's commitment to transition to a circular Victoria, and the growing level of support that is being made available to support this transition.

Read: Circularity and other targets

Circularity builds on various other concepts, so it is hardly the first idea trying to capture ways to enable a more sustainable economy. But that also means that it could easily become another buzzword on the list. Sustainability, circularity, carbon intensity, material productivity, SDGs, ESG, the list goes on. So, what is the link between *circular economy* and some of the other popular concepts we hear about in the sustainability space? How does it fit with other ideas that are seemingly just as important?

In most cases, the transition to a circular economy is complementary with other sustainability-related ideas and concepts. [This paper by the United Nations Economist Network](#) goes into more detail.

This table that summarises some of UN's thinking:

NESD Concepts	Key contributions	Complementary	Intersecting
Blue economy	Reduction of dispersion of pollutants to waterways and oceans	x	x
Green economy	Less carbon intensity through higher reuse and recovery of secondary materials.	x	x

Orange/ creative economy	Design-thinking for resource-efficient production and processes, and use of resource-efficient digital technologies.	x	
Purple/ care economy	Valuing the innovation and productive capacities of labour and improved living conditions (environmental, health);	x	
Social & solidarity economy	Opportunity for using human innovation capacities in recycling, recovery and repair activities, including solidarity economy models conducive to upgrade working conditions from informal to formal sectors.	x	x
Yellow/ attention economy	Norms setting to shift from goods-owner-ship to delivery-as-a-service models, highly driven by digital infrastructure and sustainable consumption behaviour.	x	x
Frugal/ innovation economy	Reduction of inputs and natural resources; higher traditional/ natural material usage; and emphasis on product and systems design to minimise waste. A CE also improves efficiency by aggregating resources through asset sharing business models.	x	x

Their work also highlights how a circular economy contributes to most, if not all, of the Sustainable Development Goals. This because a circular economy relies on resource efficiency and sustainable consumption and product, which are central concepts to achieve sustainable development. Consider key goals such as SDG 12 on 'Ensure sustainable consumption and production patterns' and SDG 9 on 'Build resilient infrastructure', which show clear overlap with circular objectives. In a similar vein, circularity builds upon and complements concepts such as [Cradle-to-Cradle](#), [Doughnut Economics](#), [Industrial Ecology](#), and others.

To simplify, achieving a sustainable society requires global economic production and consumption to stay within the limitations of our natural environment. This requires the use of renewable energy and resources, fair and equitable ways of doing business, and the regeneration of that environment. A circular economy provides pathways to achieve these goals. In that sense, *circular economy* is an overarching framework that encapsulates a lot of other concepts that strive for similar objectives.

Further reading

Sustainability Victoria's Strategic Plan for 2024-2027 marks a shift away from focusing just on waste and resource recovery. As we've learnt in the previous chapters, unlocking the benefits and

opportunities of a circular economy require a holistic approach. Sustainability Victoria's new Strategic Plan outlines what that holistic approach looks like, by determining what is needed next, demonstrating what is possible, and making it easy to take part for all Victorians.

You can view this [Strategic Plan](#) and how it contributes to the long-term SV2030 framework [here](#).



Chapter 2.3 – From theory to practice



Read: From theory to practice

Putting everything we've learnt so far into practice can take as many different forms as there are individual organisations or businesses in Victoria. There is no single organisation that could, or should, be responsible for the systemic shift we're talking about. All participants in the economic system have their own role to play. Each has their own stakeholders, their own resources to work with, and objectives that require consideration.

It is not the intention of this micro course to guide you to an operational, fully implemented circular solution, as that deserves a course all on its own. However, we do want to address what the circular economy looks like in practice and provide some pointers on how to get there, so you will be able to evaluate the applicability of different approaches for your context.

The first step to getting started with circularity, then, is to understand your context.

We all occupy one, or maybe several, positions in a supply or **value chain**. Whether that be as a designer, manufacturer, procurer, service provider, consumer, or perhaps a recycler of resources. Based on your position in the value chain, what are your objectives? What are your goals and boundaries, and what will a transition to circularity do to these goals and boundaries?

Understanding *why* you should make this transition will help you with the *how* down the line.

Note that your position in a value chain can change depending on what materials you work with, the level of control you have over solutions that get implemented, or even what is expected from you by your stakeholders.

For example, a local government organisation can play a role in various value chains as a procurer, consumer, and sometimes even a retailer, depending on what projects they're involved with. In contrast, a small bike shop might only be involved in a single value chain, selling bicycles and servicing them.

Consider the role your organisation or business plays in the value chain of a specific product or material, and think about what a circular way of working could do for you. How could it assist with the sustainable use of resources, or mitigation and adaptation to climate change? Or how could it help you meet the needs of your stakeholders, improve customer relationships, or simply improve business resilience? Being able to answer these questions is the first step in the circular transition.

Read: Tools to understand your context

There are several tools that can help you better understand what your context or value chain look like. Have a look at of the strategic management and design thinking tools listed below for this purpose, and to help identify areas for circular opportunities.

Explore the resources from Ellen MacArthur Foundation below:

- **Understanding Circular Flows**
In a circular economy, products no longer have a life cycle with a beginning, middle, and end. As soon as products stop being used, they are circulated back into another useful life. How and where products get circulated depends on various factors, so consider using this tool to better understand the available circular flows and determine where you sit in the system.
- **Business Model Canvas**
A common tool to map out your context is the Business Model Canvas. Consider the nine building blocks of your business or organisation, such as the resources you work with, your

core audience and how you reach them, your value proposition, and your costs and revenues. You can then use the Canvas to work out how going circular will impact these business building blocks.

- **Stakeholder Mapping**

Getting a circular product or service to market requires collaboration with stakeholders. Using this Stakeholder Mapping tool, you'll get a sense of which stakeholders you should engage with closely, and which you should simply monitor instead. Mapping out your stakeholders' interest versus power or influence will give you an idea of what parts of your value chain are most important.

- **Material Journey Mapping**

To better understand the impact your products or materials are having, and how going circular would change that, consider this more advanced tool. By working through the journey your products or materials make during their life, you'll be able to identify the points where they are having a negative impact that you might want to change. This could give you a better understanding about why the transition to a circular economy might benefit your organisation.

For more details about these tools and others, consider exploring the **Circular Design Guide by IDEO** via the Ellen MacArthur Foundation website. It includes a comprehensive toolkit comprising of worksheets, case studies and interviews with designers, providing practical guidance for application.

Module 3 – Putting circular economy into action

Welcome to Sustainability Victoria's third and final course in our three-part Circular Economy 101 series – Circularity in Practice. Thank you for joining the growing movement of organisations, businesses and governments working to turn circular economy principles into real-world action.

This short course is designed to help you understand what circularity looks like on the ground. While the transition to a circular economy is a systemic shift, it starts with practical steps that anyone can take.

You'll explore five key approaches to circularity, learn how to identify opportunities based on your role in the value chain, and discover tools and case studies that show how circular solutions are already making a difference.

Chapter 3.2 - Five approaches of the Circularity Deck

Video: 5 approaches of the Circularity Deck



Read: From the why to the how

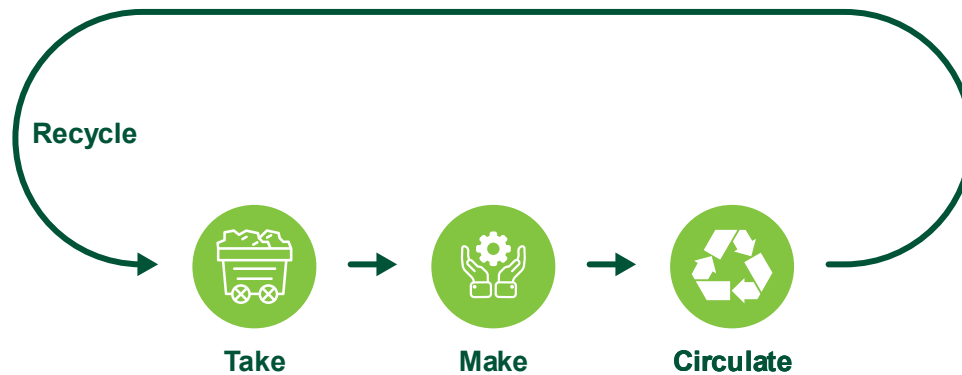
Once you have a good understanding of your context and the role you play within your value chain(s), you'll be able to determine why the transition to a circular way of working makes sense for you.

Consider making note of the tools and approaches mentioned so far, based on what appears most relevant for your business or organisation. Running through those methods within a team or group can quickly give you an indication of why a circular transition makes sense.

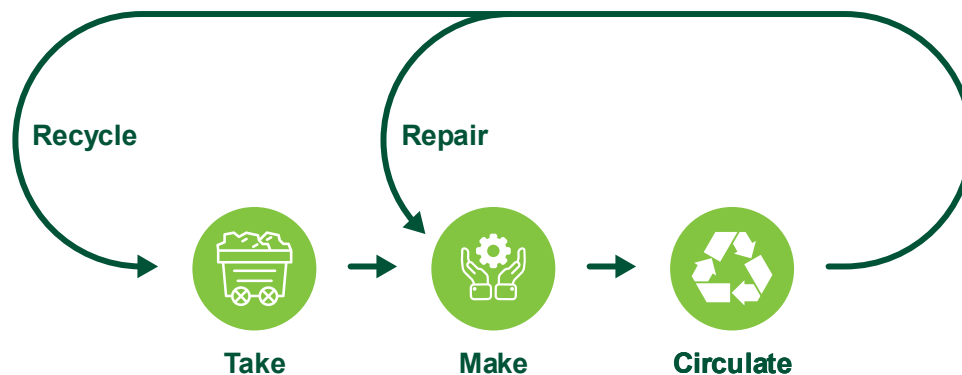
After that, it's time to tackle the *how*.

As we've learnt in the course so far, the goal is to create a closed-loop system. When products and materials stop being used, they are circulated into another useful life, and we want to keep doing that

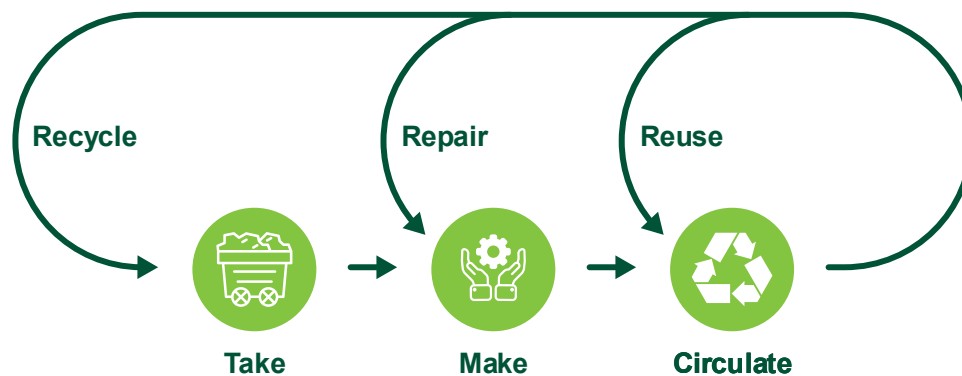
for as long as possible. One way of doing that is through recycling, which is when we take a product that is no longer being used and break it down to its base materials to be turned into a new product again.



But we can also take a short cut and repair the product instead of recycling it. By repairing the old product, we no longer need to break it down to its base materials first, so we're effectively cutting the corner.

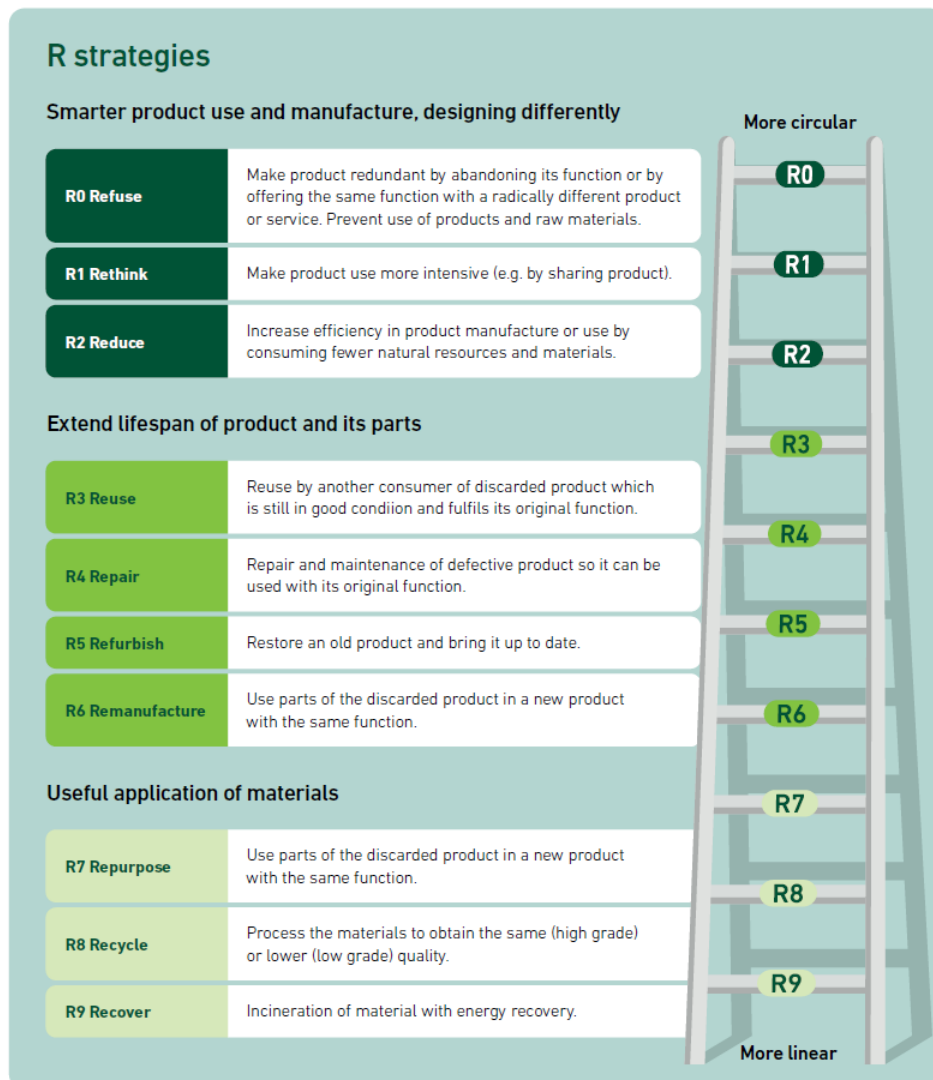


And we can take an even shorter short-cut and go for reuse. Reusing an old product just the way it is means we don't even have to bother with repair or recycling and everything involved with that.



The point is that the shorter we can make that short-cut, the smaller the loop becomes. Smaller loops equal less effort because we're using less material to circulate the product, we're using less energy to do so, less water, less transportation, etcetera. Smaller loops have a smaller impact, which implies that there is a hierarchy of sorts in the solutions we can consider to become more circular.

This hierarchy of strategies is reflected in common frameworks such as the waste hierarchy, which shares a similar message that waste avoidance is a better solution than recycling, for example. A framework that is very similar to the waste hierarchy, but builds on it with a bit more detail is the R-ladder. It ranks all the strategies that you could utilise in a circular economy based on that same principle that smaller loops have a smaller impact.

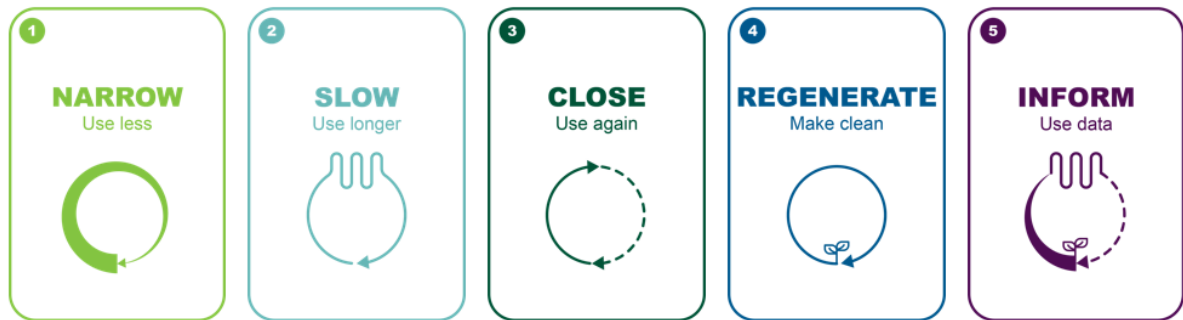


The problem with these frameworks, however, is that they still hide a decent amount of complexity when it comes to applying the listed strategies. How do you plan for refurbishment rather than remanufacturing, for example? How do you determine if repair is a suitable option in your value chain? And what do you do if your business or organisation doesn't really use physical materials in the first place?

Because of these difficulties, we recommend the use of a different framework that simplifies circular strategies for application, without losing the variety of solutions that are available. This framework is called the Circularity Deck, and has been created by Dr. Jan Konietzko as part of his PhD research at Delft University of Technology in the Netherlands. The Circularity Deck includes five distinct approaches that can be used regardless of the materials or services you work with, and regardless of what industry sector you are active in. They have been adopted by European policy and have been tested by Sustainability Victoria to work well in the Victorian context.

These are the five approaches of the Circularity Deck:

- To Narrow, using less materials and creating more value with less;
- To Slow, using materials for longer and retaining value;
- To Close, using materials again and recovering value;
- To Regenerate, using clean materials and regenerating natural systems;
- And to Inform, using data to enable and support circular ways of working.



One of the great things about using these approaches, rather than the R-ladder, to get started with circularity, is that there is no hierarchy: all of them are equally capable of helping you go circular. You can use one of the five approaches, use two, you can even use all of them at once if that makes sense for your situation. The Circularity Deck provides a gateway to circular action that allows for mixing and matching.

The next few sections of the course will go over each of these five approaches, how they work and when they make sense. They are supported by various case studies, to give examples of how they operate in practice.

The Circularity Deck by Dr. Jan Konietzko can be downloaded as a free .pdf from his [website](#), combined with a free workshop package. The Deck is also available as a [template for Miro](#). Consider having a look at these resources to get started with the Circularity Deck in your business or organisation.

Chapter 3.3.1 - Narrow

Read: How does it work?

This approach to make things circular is called 'narrow', because it aims to create solutions that narrow the flow of materials going through the system. By using less material overall, we'll have a smaller impact on the environment. We'd use less land, less energy and less water to produce stuff as well, and we'd end up with less waste too. Another way of thinking about this approach is trying to do more with less, or creating more value with the same resources.

Putting this approach into practice can be done in a variety of ways, depending on your business or organisation. The Narrow approach makes sense if the products or services you control use a large volume of materials. For example, large-scale projects that require a lot of capital investment tend to benefit from this approach, as their impact mainly comes from the sheer volume of materials used. The Circularity Deck provides a plethora of strategies to do so and makes a distinction between three different levels of implementation:

You can put the Narrow approach into action at the **product-level**, focusing on the use of less material in how a product is designed and manufactured. When your business or organisation has control over the design or production process of a product, consider these strategies:

'Narrow' approach at a product-level:

- **Design with low-impact inputs:** During product development, select materials that require less land, energy and water to produce. For example, the use of plant-based ingredients in food production requires less land, energy and water than meat-based equivalents.
- **Design lightweight products:** Products that are lighter than comparable products on the market use less material to achieve the same goal. Lighter products are generally easier to transport, too.
- **Design for multiple functions:** When a product is designed for multiple functions, it can replace the need for a bunch of individual products to achieve similar outcomes. Think about how modern smartphones have eliminated the need to carry a separate camera, music player, calendar and TV.

You can use the Narrow approach on a business model-level, when your business or organisation plays a service-focused role or procures products from other businesses in your value chain.

Consider strategies like:

'Narrow' approach at a business model level:

- **Enable and incentivise users to consume less:** Incentivising your stakeholders to be more efficient with their energy, water and material use is a great way of putting the Narrow approach into action on a business model-level. For example, educating users on how to use colder and shorter wash cycles on their washing machine will reduce both water and energy use.
- **Specify the use of efficient transport logistics:** The transportation of goods can contribute significantly to the footprint of those products. Making use of lighter and more efficient transport options, such as electric vehicles or push bikes, will lower the amount of energy and materials required for transport logistics.
- **Use local suppliers where appropriate:** Similarly to the use of efficient transportation methods, using local supply can also go a long way in reducing environmental footprints. Consider favouring locally made products over imported alternatives where appropriate.

And finally, the Narrow approach can be used on an ecosystem-level, which might be relevant when your organisation plays a coordinating or influencing role in your value chain. This usually includes government or not-for-profit organisations, who could consider this strategy:

‘Narrow’ approach at the ecosystem-level:

- **Maximise the use intensity of products:** This is about maximising the degree to which the capacity of a product is used, with the aim of decreasing the total number of products in an ecosystem. Think of a car sharing model, allowing us to decrease the number of cars on the road by getting people to drive together.

Case studies

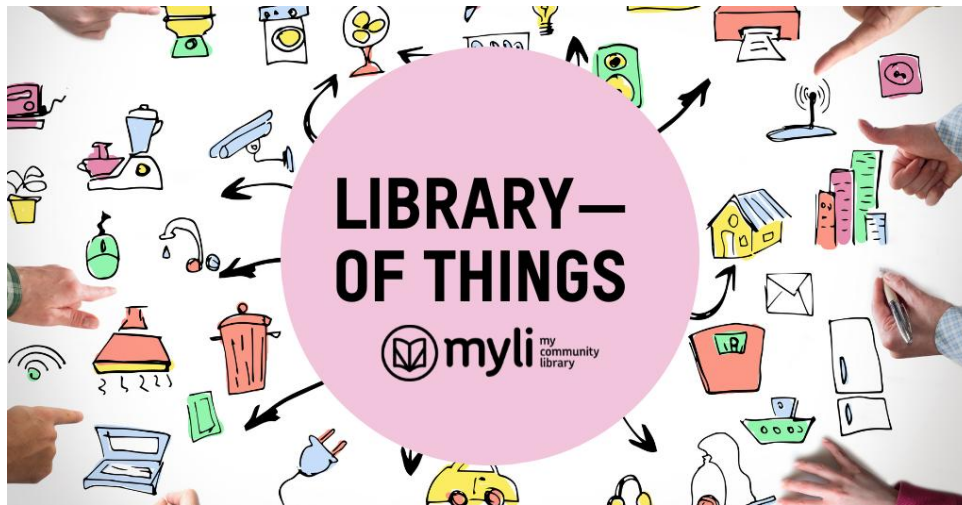
Example of product-level narrowing:

Rendine Constructions is designing and producing a prototype modular building, using obsolete building components from the Victorian School Building Authority’s Relocatable Building Program. By designing a building that is modular and easy to dis- and reassemble, they can be adjusted and changed to suit multiple functions. The components that are being used in the design of the modular building would normally contribute to waste and recycling, but can now remain in use and replace the need for multiple new buildings.



The use of modularity to make their building solution flexible enough for multiple uses, is a good example of the Narrow approach in action on a product-level. At the same time, you might have picked up on how this is an example of the Slow approach as well, as the modular nature of the solution allows for the same building to stay in use for much longer. This is a strength of the five approaches of the Circularity Deck, which can be mixed and matched to suit your needs and opportunities.

Example of business model-level narrowing:



Many of us probably have a cordless drill sitting in the shed, and maybe use it a handful of times a year before it goes back to collect dust on the shelf. In fact, a lot of the stuff we buy and own falls into this category of rarely-used products. Around Victoria and the rest of Australia, more and more Libraries of Things are popping up to provide an alternative to this. Many Councils now offer such Libraries where communities can borrow, use, and then return a variety of items instead of buying them. From Hobsons Bay City to Frankston, Baw Baw to South Gippsland, and anywhere in between and beyond, you are able to find these Libraries of Things to help communities consume less by using what's already available.

By encouraging communities to buy and own less, without really impacting their ability to still use the products they need, Libraries of Things are a fantastic example of the Narrow approach on a business model-level. There is a lot of overlap with other strategies such as offer products as a service and increasing the use-intensity of products, showing how many solutions can target multiple approaches at once.

Example of ecosystem-level narrowing:



Bass Coast Shire has experienced strong population growth over the past few years, resulting in rising traffic congestion, especially during peak tourism season. To try and solve this problem, Bass Coast Shire Council, the Department of Transport and Destination Phillip Island are undertaking pilot for a demand responsive transport network in Phillip Island and San Remo. By using clever routing algorithms that calculate the most efficient pick-up and drop-off points, this new public transport network will be much more efficient with the same number of vehicles as the traditional bus network. By switching to electric busses on top of that, this new network will be able to achieve better outcomes with a whole lot less material and resources.

The way this project improves the efficiency of the local public transport network is an excellent example of the Narrow approach on an ecosystem-level. The use of clever routing algorithms prevents empty busses from driving around on unpopular routes, meaning that the use-intensity of those busses is improved.

Chapter 3.3.2 - Slow

Read: How does it work?

The 'Slow' approach is focused on slowing down the speed at which materials flow through the system, delaying the moment at which they need to be recirculated in one way or another. If we use a product for longer, the average impact it will have during its useful lifespan will be less. Let's say you're in the market for a new vacuum; buying one that needs replacing every year will obviously result in a bigger need for new materials when compared to a durable vacuum that lasts for five years or longer. Using stuff for longer is a great way to retain value in a value chain.

The Slow approach makes sense if the products or services you manage involve valuable, problematic, toxic, or otherwise tricky materials. Using those materials for longer and postponing the moment they need to be recirculated in a circular economy will generally reduce their impact. Similarly, solutions that are complex or require specialist knowledge to develop or operate will benefit from this approach, because alternatives could be hard to find. Putting the Slow approach into action can look like this, when implemented on three different levels:

You can put the Slow approach into practice at the product-level, focusing on increasing the longevity of the product during design and manufacturing. When your business or organisation has control over the design or production process of a product, consider these strategies:

'Slow' approach at a product-level

- **Design for physical durability:** Products designed to be more durable will last longer, increasing their useful lifespan. Durable products are also easier to reuse.
- **Design for emotional durability:** Another way of making a product last longer is to design a product that users will love and trust over a long period of time, making it less likely to get thrown away prematurely.
- **Design for ease of maintenance and repair:** Products that will last longer when kept in good nick. Design them to enable and support **maintenance** or **repair**.
- **Design for easy dis- and reassembly:** When a product can be easily dismantled and reassembled afterwards, it becomes easier to facilitate maintenance and repair activities.
- **Design for upgradability and modularity:** A product can be made upgradeable if its functionality or performance can be improved during or after use. The use of modularity can assist with this by making upgradeable components easily interchangeable.
- **Design for standardisation and compatibility:** When a product uses standard components, parts or interfaces, refurbishment and repair become easier to do. When a product breaks, its components can easily be reused in another product if needed.

On a business model-level, you can use the Slow approach when your business or organisation plays a service-focused role or procures products from other businesses in your value chain. Consider strategies like:

'Slow' approach at a business model level:

- **Provide maintenance and repair services:** Making a product repairable is one thing, but actually making that happen is another. The availability of maintenance and repair services will help users do so.
- **Provide services to upgrade or adapt your products:** As with making a product repairable, making a product upgradeable might not do much without an associated service to make that happen. Offering such services will help users make use of this type of functionality.

- **Remanufacture existing products and components:** Products that are at the end of their life can be collected for their components and parts to be reused in other products that might require a repair or upgrade. This is called **remanufacturing**.
- **Repurpose existing products and components:** When products can no longer be remanufactured or **refurbished**, consider how their components can be **repurposed** in a completely different product, extending their value.
- **Provide increased warranty:** Warranties are a great tool to show customers that your products are made to last and gives them a pathway to keep products in use for longer.
- **Encourage sufficiency:** Another way to make existing products last longer is to encourage your customers to moderate their consumption of your products.
- **Provide the product as a service:** Not all products need to be owned, as it is often their functionality that is important. Offer a product as a service, under a product-, use-, or results-oriented model, keeps the ownership of the product with the business. This makes it easier to keep it in use for longer.

The Slow approach can also be used on an ecosystem-level, which might be relevant when your organisation plays a coordinating or influencing role in your value chain. This usually includes government or not-for-profit organisations, who could consider this strategy:

‘Slow’ approach at an ecosystem-level:

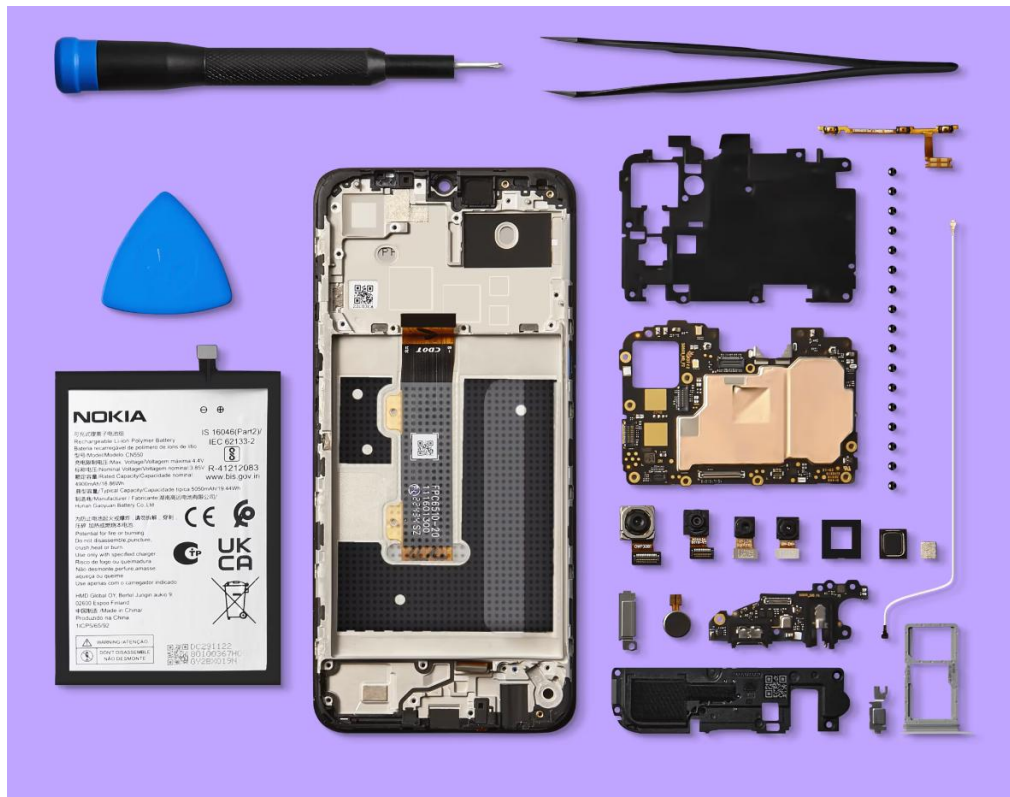
- **Turn disposables into a reusable service ecosystem:** Where single-use or disposable products are used, consider making use of or providing a service that replaces them with durable, reusable products. Think of a food court in a shopping centre providing durable cutlery and crockery that can be washed and reused, rather than single-use alternatives.

Notes:

1. **Maintenance:** Maintaining means inspecting a product so as to retain its functional capabilities- [Circularity Deck](#)
2. **Repair:** Repairing is about restoring a product to a sound/good condition after decay or damage - [Circularity Deck](#)
3. **Remanufacturing:** Using parts of a discarded product to make, repair, or upgrade a new product with the same function - [Sustainability Victoria Strategic Plan 2024-2027](#)
4. **Refurbished:** Restoring an old product and bringing it up to date - [Sustainability Victoria Strategic Plan 2024-2027](#)
5. **Repurposed:** Using parts of a discarded product in a new product with a different function - [Sustainability Victoria Strategic Plan 2024-2027](#)

Case studies

Example of product-level slowing:



Human Mobile Devices are a Finnish company designing phones and other mobile devices. In the past they designed phones for Nokia, but have recently started developing their own devices. Their aim is to make phones that stick around by making them tough, secure, and affordable. Some of their devices are even built to enable Repair-It-Yourself, partnering with iFixit to offer guides, tools and genuine replacement parts. Designing their devices to be repaired allows users to fix cracked screens, replace batteries, and keep their phones in use for much longer. You can purchase their phones from most electronic stores in Australia.

Designing products be easy to disassemble and repair, and partnering with a service provider to offer the needed tools, guides and parts to do so is a textbook example of the Slow approach in action on the product-level. Consider reading up on the Australian Repair Network to learn more about what is happening in this space in Australia.

Example of business model-level slowing:



Global outdoor brand Kathmandu is addressing the issue of textile waste through their pilot program Kathman-REDU. This program intercepts used, damaged or otherwise faulty products that would normally be destined landfill. The items are then repurposed by repairing, washing and relabelling them to be resold under the Kathman-REDU label at Kathmandu retail stores in Victoria. These products are currently available at the Kathmandu Galleria store in Melbourne's CBD. Learn more about the details of this project [here](#).

Kathmandu designs products built for a lifetime of adventure, so a bit of wear and tear shouldn't mean the end of a perfectly good product. The REDU project gives imperfect garments a new lease on life, which is a perfect example of the Slow approach in action.

Example of ecosystem-level slowing:



The Nappy Project is an initiative aimed at implementing a reusable nappy program, in collaboration with 14 Victorian councils. By providing support and resources, the project aims to empower parents and caregivers to choose reusable nappies as an effective and sustainable alternative to expensive, single-use nappies for their little ones. The project builds on a feasibility study managed by the City of Monash, finding that a targeted strategy and campaign on the use of reusable nappies would enable communities to shift an accepted, but very linear, system into a more circular one.

Although the use of disposable items can be accepted as normal in some cases, that doesn't mean that better, more circular, alternatives aren't an option. The Nappy Project is an exciting example of the Slow approach on an ecosystem-level, by turning disposables into a reusable service ecosystem. The fact that it is supported by 14 individual councils means that this ecosystem has a wide reach, allowing many parents and caregivers to benefit from the high-quality, toxic material-free nappies.

Chapter 3.3.3 - Close

Read: How does it work?

The 'Close' approach is perhaps one of the more obvious ways to develop circular solutions, as it is focused on closing the loop. This approach aims to take waste out of the equation by turning one product's waste into another product's feedstock, replacing the need for new materials to be extracted from the environment. By using materials again after the product they're embedded in is discarded, we can recover the value that was invested to make that product in the first place. This is commonly referred to as **recycling**.

Using the Close approach tends to make a lot of sense when your product or service uses a single type of material. It is easier to close the loop on projects that use a limited number of different materials. Think about the construction of a dining table, for example, which might be made from timber and some metal braces and screws. Closing the loop would require you to manage just these two materials. This contrasts with a laptop which might use more than 50 different types of materials, making it a rather arduous task to close the loop for all of them. Putting the Close approach into action can look like this, when implemented on three different levels:

On the product-level, the Close approach focuses on recovering the value embedded in the product and using the constituent parts, components or materials again. When your business or organisation has control over the design or production process of a product, consider these strategies:

'Close' approach at a product-level:

- **Design with recycled inputs:** Specify the use of materials that have been recycled from other products and components. The higher the level of recycled content you design with, the bigger the volume of materials on which you are closing the loop.
- **Design with materials suitable for recycling:** Recycling goes two ways: a product can be designed using recycled materials, but a product can also be designed to go on to be recycled. For a true circular solution, both should be true.
- **Design for mono-materiality:** Recycling methods and technologies differ for each type of material. Designing products to make use of a minimal, or even single, type of material will make recycling much easier.

On a business model-level, you can use the Close approach when your business or organisation plays a service-focused role or procures products from other businesses in your value chain. Consider strategies like:

'Close' approach' at a business model level:

- **Reuse and sell components and materials from discarded products:** When a product cannot be reused in its entirety, consider the possibility of reusing and selling its components or materials instead, creating new value from waste.
- **Enable and incentivise product returns:** The capability to recycle products is useless if the recyclable products don't find their way to the facility. Make sure there are **reverse logistics** in place to get products back after they are thrown out.

- **Recycle products in appropriate facilities:** Make sure that the products you put on the market can and will be recycled in the appropriate facilities. As Victoria's recycling system expands, the capacity to manage specific materials might be constrained. Take that into consideration when developing new products. You'll find detailed information on the state of Victoria's recycling and resource recovery sector on [Recycling Victoria's Data Hub](#).

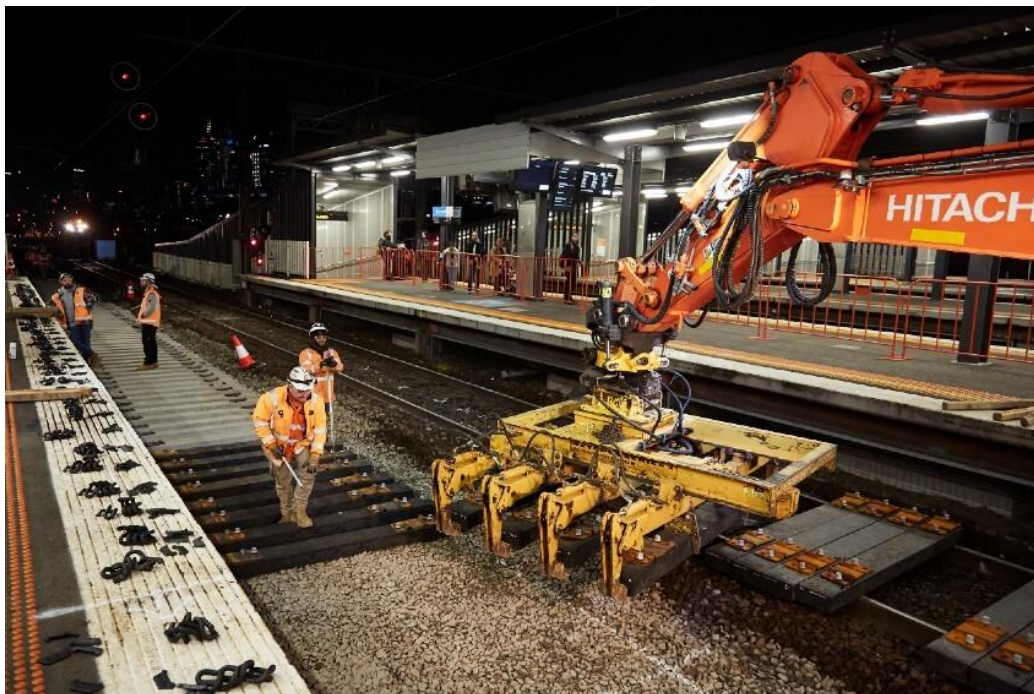
The Close approach can also be used on an ecosystem-level, which might be relevant when your organisation plays a coordinating or influencing role in your value chain. This usually includes government or not-for-profit organisations, who could consider these strategies:

'Close' approach at an ecosystem-level:

- **Build local waste-to-product loops:** The logistics needed to make recycling a viable endeavour can grow very quickly based on what materials you're working with. Try and find local resource loops by turning the waste of a given facility into new products that can be sold back to the same facility, simplifying the reverse logistics.
- **Engage in industrial symbiosis:** Similar to building local waste-to-product loops, businesses that are located closely to each other can collaborate to simplify reverse logistics. By sharing or exchanging by-products, materials, energy, or waste among nearby facilities, the result can be a simplified and mutually beneficial closed loop called industrial symbiosis.

Case studies

Example of product-level closing:



The [Monash Institute of Railway Technology](#), in collaboration with [Integrated Recycling](#), is actively researching the application of recycled plastic railway sleepers as an alternative to traditional sleepers made from timber, concrete and steel. As part of the research to demonstrate the feasibility of using this Duratrack sleeper made from 85% post-consumer plastic waste, hundreds of sleepers have been installed on tracks and in stations across Victoria. These composite sleepers have a lifespan of up to 50 years, a lower carbon footprint than timber, concrete and steel sleepers, and divert an enormous amount of plastic waste from landfill. But, transport infrastructure is beholden to strict standards and requirements, making this research project an essential step in designing a new, circular product. You can read more about this project [here](#).

This is a great example of the Close approach in action, showing how designing a product with recycled input can yield amazing results for emission and waste reduction, but also for a superior solution overall.

Example of business model-level closing:



Reground is a social enterprise helping organisations and individuals create a circular economy. They started out by working with coffee roasters and cafes in Melbourne's CBD, collecting their ground coffee that would normally go to landfill. The coffee grounds are used as a fertiliser, available free of charge to local communities and home gardeners. Since then, Reground have expanded to offer waste minimisation services, work with local, state and federal governments, and are now able to take ground coffee, chaff and soft plastic to prevent those materials from going to landfill. You can read about how Reground was selected to be a finalist in the Premier's Sustainability Awards 2022 [here](#).

How Reground is enabling and incentivising coffee roasters and cafes to recycle their waste products is an amazing example of the Close approach in action on a business model-level. You might be able to tell how Reground uses this approach in combination with the Regenerate approach by finding ways to use coffee grounds as a fertiliser. The way they use this material to foster circular ideas in the local community even includes bits of the Inform approach, showing how these strategies can be mixed and matched in a way that works for your business or organisation.

Example of ecosystem-level closing:



The City of Ballarat is embracing a transition toward a circular economy. Supported by Development Victoria, the council has started the development of a Circular Economy Precinct. One objective is to provide a solution to managing local waste and recycling material streams in a circular way, but another is to locate circular businesses together. Remember how a circular economy requires collaboration across the value chain, and a way for resource to go both up and down the stream for reuse, refurbishment, or other circular ways of processing. Co-locating such businesses together will simply reverse logistics and collaboration, fostering industrial symbiosis.

The objective is to achieve a level of symbiosis as shown in Kalundborg in Denmark. Since 1972, Kalundborg Symbiosis is a partnership between multiple public and private companies to circulate resources, by-products and waste between facilities to ensure all of it is used productively.

Building partnerships across value chain and networks to enable symbiotic outcomes is a good example of the Close approach in action on an ecosystem-level. The use of precincts to deliver such circular outcomes from the planning phase is picking up steam because of the benefits that can be built in. Precincts like this can become hubs of innovation and the source of solutions that make use of all five approaches of the Circularity Deck.

Chapter 3.3.4 - Regenerate

Read: How does it work?

The 'Regenerate' approach takes a slightly different angle, focusing on the use of renewable resources rather than non-renewable ones. Renewable materials are named as such because they are biological materials that can be grown through natural means in the environment. Because they are biological in nature, these materials can be broken down, composted, and turned back into nutrients that allow the next batch of renewable materials to grow. By using the natural growth cycle of the biosphere, the use of these materials cannot only reduce our environmental impact, but even regenerate the environment, becoming nature positive.

A core principle of the Regenerate approach is that it only works when all materials involved are biological. Closing the loop with renewable materials uses a different cycle than technical, or finite, materials. This is explained in detail by the [Ellen MacArthur Foundation](#), showing how finite materials such as metals and plastic can be reuse or recycled, whereas renewable materials can be composted or otherwise turned into biochemical feedstock. This is why it is essential in a circular economy to keep renewable and technical materials separate, and why the Regenerate approach can also be referred to as making materials 'clean' by filtering out technical contaminants. Using the Regenerate approach tends to make sense when your products or services revolve around the use of biological and organic materials. Green waste, food organics, and most agricultural projects are well-suited to this approach, as long as the extraction rate is equal to or lower than the recovery rate. Renewable materials need time to grow, after all!

Putting the Regenerate approach into action can look like this, when implemented on three different levels:

The Regenerate approach can be implemented on the product-level when your business or organisation has control over the design or production process of a product. If you do, consider these strategies:

'Regenerate' approach at a product-level:

- **Design with renewable materials:** Design products with low-carbon, renewable materials to reduce their impact on the environment. Take the expected end-of-life treatment (e.g. composting or anaerobic digestion) into consideration to avoid unintended consequences.
- **Design with non-toxic materials:** Growing new renewable materials is only possible if the conditions for growing are right. This requires the elimination of toxic materials that could negatively impact soil health, nutrient availability, or water quality, for example.
- **Design self-charging products:** The use of renewable resources does not only apply to materials, but energy and water as well. Design electronically powered products to be self-charging through the sun or kinetic energy, to reduce their dependence on centralised sources of energy. Especially for mobility assets, this can create interesting opportunities.

On a business model-level, you can use the Regenerate approach when your business or organisation plays a service-focused role or procures products from other businesses in your value chain. Consider strategies like:

'Regenerate' approach at a business model level:

- **Provide services that close the renewable loop:** Just because organic products can be circulated back into the biosphere doesn't mean that this actually happens. Consider enabling that pathway by offering composting services, or other ways to close the loop on renewable materials.
- **Find alternative uses for organic waste:** In particular for food production, organic waste is common even before the point of sale. Consider how organic waste like this can be used to produce alternative products or services.
- **Produce, process and transport with renewable energy:** Powering your business with renewable energy will reduce not only the operational footprint of your activities, but also the embodied energy embedded in any products you might manufacture. Consider how this applies to transport logistics as well.
- **Power the use of the product/service with renewable energy:** Once you have solutions on the market, consider how you can use creative partnerships or service-based models to ensure your solutions are powered with renewable energy. For example, could customers be offered a discount if they commit to using renewable energy to power your products?

The Regenerate approach can also be used on an ecosystem-level, which might be relevant when your organisation plays a coordinating or influencing role in your value chain. This usually includes government or not-for-profit organisations, who could consider these strategies:

‘Regenerate’ approach at an ecosystem-level:

- **Embed renewable energy production into existing infrastructure:** Finding ways of making renewable energy production part of any existing infrastructure will benefit the whole value chain by reducing the footprint of production and services.
- **Recover nutrients from urban areas:** Urban areas are responsible for the majority of consumption and waste generation, which includes organic waste. At the same time, the nutrients and renewable materials in that organic waste are often lost. Finding ways to recover those nutrients can help create new opportunities for businesses focused on renewable materials.
- **Regenerate polluted ecosystems:** Polluted ecosystems affect most, if not all, businesses and organisations. Contributing to their regeneration and clean-up will reduce the footprint of all value chains and systems.
- **Manage and sustain critical ecosystem services:** Similarly, managing and sustaining ecosystems after their regeneration goes a step further in regenerating the natural systems we all rely upon.

Case studies

Example of product-level regenerating:



The Institute of Frontier Materials, located within Deakin University, is a world-leading research institute dedicated to redesigning functional material for a circular economy. In collaboration with Humble Bee Bio, they are working to characterise a bee-inspired biopolymer suitable for the sustainable production of a bio-yarn. By replacing non-renewable synthetic yarns, such as polyester, with renewable biopolymer yarns, this project intends to remove toxic and problematic materials for textile production. This eliminates the shedding of microplastics, but also enables for this material to become biodegradable. Learn more about this project Biofibres for sustainable apparel inspired by Humble Bee via the The Circular Economy Business Innovation Centre website.

The substitution of polluting, finite plastics with bio-based, renewable alternatives is a perfect example of the Regenerate approach in action at the product-level. It packs in a double-whammy by also enabling the loop to be closed on textile yarns, which is the Close approach in action as well.

Example of business model-level regenerating:



As a Victorian-first, [Fresh Select](#) and [Nutri V](#) developed a food processing hub in the South Werribee growing district that upcycles surplus vegetables and by-products into value-added foods and ingredients such as powders and snacks. They are also helping local growers use 100% of their crop while minimising food waste on farms, in pack-houses, and during food manufacturing. Nutri V vegetable powders are now available at Coles supermarkets. Learn more about Melbourne's first zero waste food upcycling hub [here](#).

This is a great example the Regenerate approach in action on a business model-level, finding alternative uses for organic waste and making the most out of biological, renewable materials. At the same time, turning the waste products from farms, pack-houses and food manufacturing into a new product allows local growers to do more with the same crop. So, this is a great example of the Narrow approach as well, creating more value with the same amount of material.

Example of ecosystem-level regenerating:



Follow the Flowers is an initiative of Outback Academy Australia, being piloted in a network of farms across Victoria. The initiative is focused on boosting First Nations-led regenerative farming practices and realising business opportunities in the production of native products across the state. A primary purpose of the program is to provide a step towards reconciliation and self-determination for First Nations people, but another purpose is to heal Country by generating the land, restoring water and soil quality, and restoring biodiversity. You can learn more about how the Victorian Government is supporting this project [here](#).

With the purpose of healing Country, the Follow the Flowers initiative is a wonderful example of the Regenerate approach on an ecosystem-level. Being First Nations-led, the initiative also supports reconciliation and self-determination, which is key to developing a sustainable and regenerative social ecosystem that is underpinned by Traditional Owner knowledge.

Chapter 3.3.5 - Inform

Read: How does it work?

The 'Inform' approach refers to the use of data and technology to make solutions more efficient, easier to repair, or simply last longer. In practice, the use of the Inform approach will look very similar to the other four approaches of the Circularity Deck, but supported by the use of data and smart technology. As the adage goes 'you can't influence what you can't measure', and that holds true especially in the circular economy where circular solutions are not yet fully understood.

If your business or organisation doesn't really make use of physical materials, or if the other approaches do not make a lot of sense for your operations, the use of the Inform approach might appeal. Detailed data collection and analysis can be used to find efficiencies or assist with improving one of the other approaches. Putting the Inform approach into action can look like this, when implemented on three different levels:

You can put the Inform approach into practice at the product-level if your business or organisation has control over the design or production process of a product, consider these strategies:

'Inform' approach at a product-level:

- **Virtualise:** Offering products and services virtually does away with the need for physical materials altogether. For example, think about how the rise of music streaming services has reduced the need for physical CDs and other media to be produced. Consider what solutions you currently offer could be virtualised instead.
- **Design connected products:** Making products more effective or efficient can rely on the optimisation of how and when they are used. Designing those products with sensors and connectivity to send and receive different types of data can assist with this.
- **Use AI to develop products with circular properties:** The rapid evolution of the application of AI creates opportunities to improve circular outcomes. Consider how AI can be used to rapidly analyse design options or select the best material.

On a business model-level, you can use the Inform approach when your business or organisation plays a service-focused role or procures products from other businesses in your value chain. Consider strategies like:

'Inform' approach at a business model level:

- **Use product-in-use data:** Whether through the use of sensors and connected products or other means, data on how your solutions are used by the target audience can help with making better design decisions for future products and services.
- **Track product resource intensity:** In a similar way, tracking the resource use of products while they are in use can help influence user behaviour to decrease resource intensity. For example, consider how better understanding the power consumption of your kitchen appliances can help you use them more efficiently.
- **Track the condition, location, and/or availability of a product:** Circular solutions rely on reverse logistics to close the loop. Being able to track the condition, location and availability of a product will help you doing so.

The Inform approach can also be used on an ecosystem-level, which might be relevant when your organisation plays a coordinating or influencing role in your value chain. This usually includes government or not-for-profit organisations, who could consider these strategies:

'Inform' approach at an ecosystem-level:

- **Market circular products, components and materials through online platforms:** The use of online platforms is a great way to allow businesses and organisation to market their circular solutions, and also allow others to find their needed circular components and materials.
- **Build material database ecosystems:** Material databases describe the characteristics of materials and components. Developing or leveraging such databases can assist with selecting better materials during design, but also provide reference material on how materials are best recycled, reused, or refurbished.
- **Co-create products, components, material and information via online platforms:** Online platforms can also be used to 'crowdsource' the design of solutions, simplifying the collaborative aspect of the circular economy.
- **Use AI to optimise circular infrastructure:** As with using AI to develop more circular products, artificial intelligence has evolved to the point where it can be used to find efficiency gains for entire value chains. Consider how AI can be used to help optimise your circular infrastructure.
- **Operate service ecosystems via online platforms:** For solutions that require several actors who need to coordinate their interactions, online platforms can help them do so. For example, think of ride sharing services where the driver and the passenger are matched on demand through an app on their phones.
- **Provide education services:** When trying to influence others to adopt circular practices, providing education services on the circular economy can help them get started.

Case studies

Example of product-level informing:

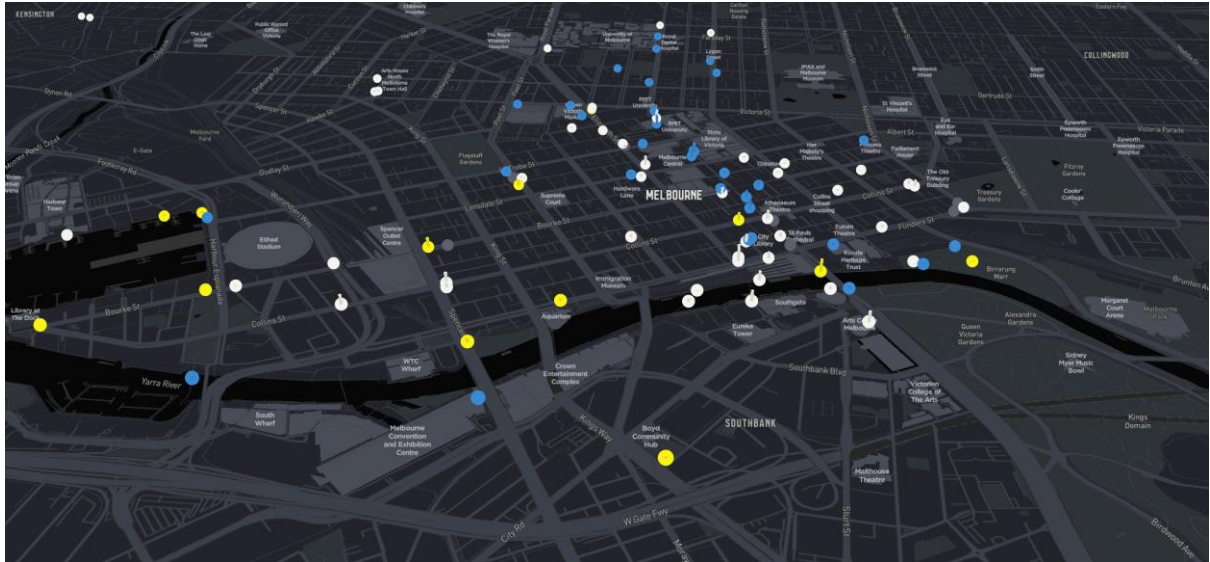


Most readers might have heard of the luxury car brand, Rolls-Royce, but did you know they produce aircraft engines as well? Rolls-Royce understands that optimal engine performance is crucial for the productivity of many industries, because less downtime equals more action. An important aspect of engine productivity is maintenance and repair, especially for engines used in high-load and critical situations like in aircraft. The company embeds a network of sensors and Internet-of-Things connected solutions within their engines, aggregating data when the engines are in use. This data is then used to make their products more efficient, more durable, and easier to repair. This not only increases the productivity for their customers, but reduces the need for new engines as well, in turn reducing the environmental impact of their business.

Read more about how Rolls-Royce is powering better performance and customer experience with the Internet of Engines via the [Rolls Royce website](#).

The use of sensors and connected components to improve the performance of your products is a great example of the Inform approach in action on a product-level. It's important to understand that product performance is not only about fuel or electricity use, it is also about material use, how long the product lasts, and how easy it is to maintain and repair.

Example of business model-level informing:



The City of Melbourne employs an automated network of sensors that provide information about pedestrian activity within the municipality. Data from the pedestrian counting system can tell the Council how people use different city locations at different times of day, to better inform decision-making and plan for the future. The data helps the Council identify opportunities to improve walkability and monitor how changes in urban planning affect the city. You can access the City of Melbourne's online visualisation tool to get a view of pedestrian volumes here.

This use of sensors to track how city assets are being used is a perfect example of the Inform approach in action on a business model-level, because it helps inform more resource efficient design solutions in the future. Consider how something similar might apply to your organisation or business, where such information can be valuable to design more effective and efficient solutions.

Example of ecosystem-level informing:



A circular economy transition relies on cross-sectoral collaboration, quality data and wide-ranging business support. The [RMIT Activator](#) runs a Circular Tech program, designed to accelerate startups with cutting-edge circular technology innovations. The integration of this service into the RMIT Activator allows for entrepreneurial connections, support for startups, and the facilitation of partnerships as well. This program evolved from the SV-funded Victorian Circular Activator. Learn more about how the circular activator was set up [here](#).

The enabling and support role that the Victorian Circular Activator plays in the state's transition to a circular economy is an excellent example of the Inform approach in action at the ecosystem-level. The use of an online platform, education and support benefit all businesses and organisations active in the circular economy.

Learn more about how the circular activator was set up [here](#).

Chapter 3.4 - Making and measuring progress

Read: What does progress look like?

As mentioned before, this course is not intended to equip you with all the tools and guidance needed to fully implement a circular solution. But to help you assess the applicability of the discussed approaches, it's worth touching upon how to make and measure progress.

The examples shown as part of the five approaches of the Circularity Deck highlight that a lot of solutions make use of multiple approaches at the same time. This is one of the strengths of this framework, as ways to Narrow, Slow, Close, Regenerate and Inform often overlap and complement each other. You can mix and match these approaches in ways that make sense for your context or organisation. Don't hesitate to experiment and consider how these approaches might impact the context you live and work in.

Once you've identified an approach (or combination of approaches!) that makes sense for your organisation and context, you can narrow your circular action further by picking a specific strategy on a product-, business model- or ecosystem-level. Multiple strategies might make sense, so the use of design thinking methods can be useful to pick your best option.

Consider the three pillars of a successful solution to identify the best direction:

- **Desirability** – Would your new circular solution be desirable? Think about the benefits and trade-offs to your key stakeholders. Would they support this?
- **Viability** – Is your new circular solution viable? What would it cost? Think about this financially, but also in terms of materials and human resources.
- **Feasibility** – Will your circular solution be feasible? What is needed that doesn't currently exist? And is that hard to achieve?

As with any organisational or business decision, effective communication is key. Communicating and collaborating with your stakeholders, internally or externally, is needed to build the required transparency across the value chain for circular solutions to work.

But regardless of the direction you choose, note that the transition to a circular economy is not a black-and-white proposal. There is no need to achieve a perfectly circular value chain to make progress, and there is also no need to achieve progress overnight.

Small steps in the right direction are still progress. Reusing a bit more is progress. Recycling a bit more is progress. Consuming a bit less is progress. Any measure of Narrowing, Slowing, Closing, Regenerating or Informing is progress. So, consider that even going *circular-ish* is also progress.

Resources: Metrics and measures

Once progress has been made, it's worth finding ways to measure and document the extent of that progress. The relative immaturity of circularity means that Australia does not have a nationally agreed-upon way to do so yet, but there are some relevant things to consider. Your use of materials that are reused, recycled or renewable is a good place to start measuring progress.

Similarly, when you select an approach from the Circularity Deck, consider what it is you're targeting, and how you could measure progress. For example, if you intend to use the Narrow approach and increase the use-intensity of your products, how can you measure that use-intensity? Or if you want to use the Close approach and source from local suppliers only, how can you keep track of what is

sourced locally versus externally? As with making *circular-ish* progress, measuring that progress can start with small steps.

Once you're ready to dive into the topic of indicators in more detail, consider that measuring circularity can be done in two distinct ways, each of which has relevance for a different type of business or organisation:

Material circularity assessment

Most relevant for businesses involved in the production or sale of physical materials or products, this approach is about analysing the resources coming in and determining what percentage of them is reused, recycled or renewable. Likewise, the resources going out can be analysed to see what percentage goes on to be reused, recycled or renewed. Expand this to include energy and water, and you've got a good sense of how circular your business really is.

This way of measuring circularity has a lot in common with doing a Life Cycle Analysis (LCA) or Material Flow Analysis (MFA). You'll find guidance on this way of measuring circularity in resources such as these:

- [World Building Council of Sustainable Development's Circular Transition Indicators, v4.0](#), offering a framework and metrics for businesses to report on their progress.
- [ISO 59020:2024](#) – Measuring and assessing circularity performance, providing detailed guidance on how to calculate circularity performance.
- [Circelligence](#) by the Boston Consulting Group, offering an end-to-end assessment platform and service.
- [CSIRO's material flow analysis of Australia](#), detailing how Australia uses materials.
- [Measuring circular business models](#), detailing a project undertaken by Sweden's research institute RISE on how to measure circularity.

Circularity transition assessment

More relevant for service-oriented businesses and government organisations, this approach is focused on measuring the transition of our economy towards circularity. It is less concerned with the exact level of circularity of a business, and instead looks at leading indicators on awareness, collaboration, business model adoption, and other measures that can give us a sense of how the circular transition is tracking.

Methods and resources are less prevalent than for a material circularity assessment, but consider exploring some of these resources to learn more:

- [Circle Economy's Circular Metrics for Business](#), providing an overview of various other circular metrics and when they are relevant.
- [Monitoring Progress towards a Resource-Efficient and Circular Economy](#), developed by the OECD, offers indicators that look at not only material lifecycles, but also interactions with the environment, the impact of our responses, and socio-economic opportunities.
- [The Circular Indicators for Governments](#), by the Platform for Accelerating the Circular Economy goes into more detail by providing guidance on how to develop metrics and how they are connected to impact.
- [The Australian Circularity Benchmarks](#), by Circular Australia. This dataset offers a look at how Australia is progressing, nationally, towards a circular economy.
- [The State of Sustainability Report](#), by Sustainability Victoria. This research report keeps track of the attitudes, beliefs, and behaviours of Victorians towards sustainability.

Recommended for those who are quite advanced in their circular journey, the International Organization for Standardization (ISO) released a series of standards focused on the circular economy in 2024. ISO standards represent the internationally agreed-upon best ways of doing certain things. Categorised under the ISO 59000-series of standards, you will find three published standards related to circularity, and multiple technical reviews and assessments currently under development. These standards can only be accessed for a fee, but include the following information:

- ISO 59004 discusses the vocabulary, principles and guidance for implementation for a circular economy. This is the main document the other standards refer back to, and provides an overview of what type of actions can contribute to a circular economy. The actions align with the five approaches of the Circularity Deck, and this document is well-suited for organisations starting out with circularity.
- ISO 59010 provides more detailed guidance on what an organisation can consider to transition to a circular way of doing business. This includes goal setting, developing a circular strategy, and transitioning a business model to circularity. This document would be relevant for businesses exploring the next step towards circularity.
- ISO 59020 goes into the data that should be collected and assessed to measure an organisation's progress towards a circular economy. It offers a framework for doing so and includes guidance on assessment and reporting. This standard is recommended for organisations well underway in their transition to circularity.

Chapter 3.5 - What's next?

Video

