

CIRCULAR BUSINESS OPERATIONS

Key Insights and Policy Recommendations

Highlights

- The circular economy promotes the use of resources in a more efficient and environmentally conscious manner.
- Policy must focus on material inputs, to better understand the negative environmental impacts affected by outputs in our economy. Procurement officers lead the path for integrated business operations, and are therefore, vital to sustainable transitions within organisations and beyond.
- The government of the Netherlands aims to reduce 1 megaton of CO₂ through circular procurement, which involves the consideration of what happens to a product at the end of its life in the procurement stage and putting the product to optimal use again at the end of its life (Ministerie van Infrastructuur en Waterstaat, 2021). Procurement policies are a means of reaching this goal.

Executive Summary

Our predominantly linear economy based on a take-make-dispose model of consumption is incompatible with the finite resources available to us on Earth. Major organisations such as corporations and governments make a large proportion of purchases that prompt immense material demands which negatively harm the planet. The government of the Netherlands, for example, made up 12% of total spendings on products and services within the country in 2019.

While circularity is a promising model to close loops and put an end to the take-make-dispose mentality, such issues should be tackled at the root; material inputs. Procurement thereby becomes a promising area to study and reform.

While many barriers exist that slow the adoption of circular procurement practices, there are plenty of opportunities in this area that can help to pave the way for a circular future.

This policy brief concludes with four policy recommendations: (1) a new hierarchy of R strategies, (2) true pricing, (3) implementing material flow passports and (4), improved contract management.

Introduction

The Circular Economy

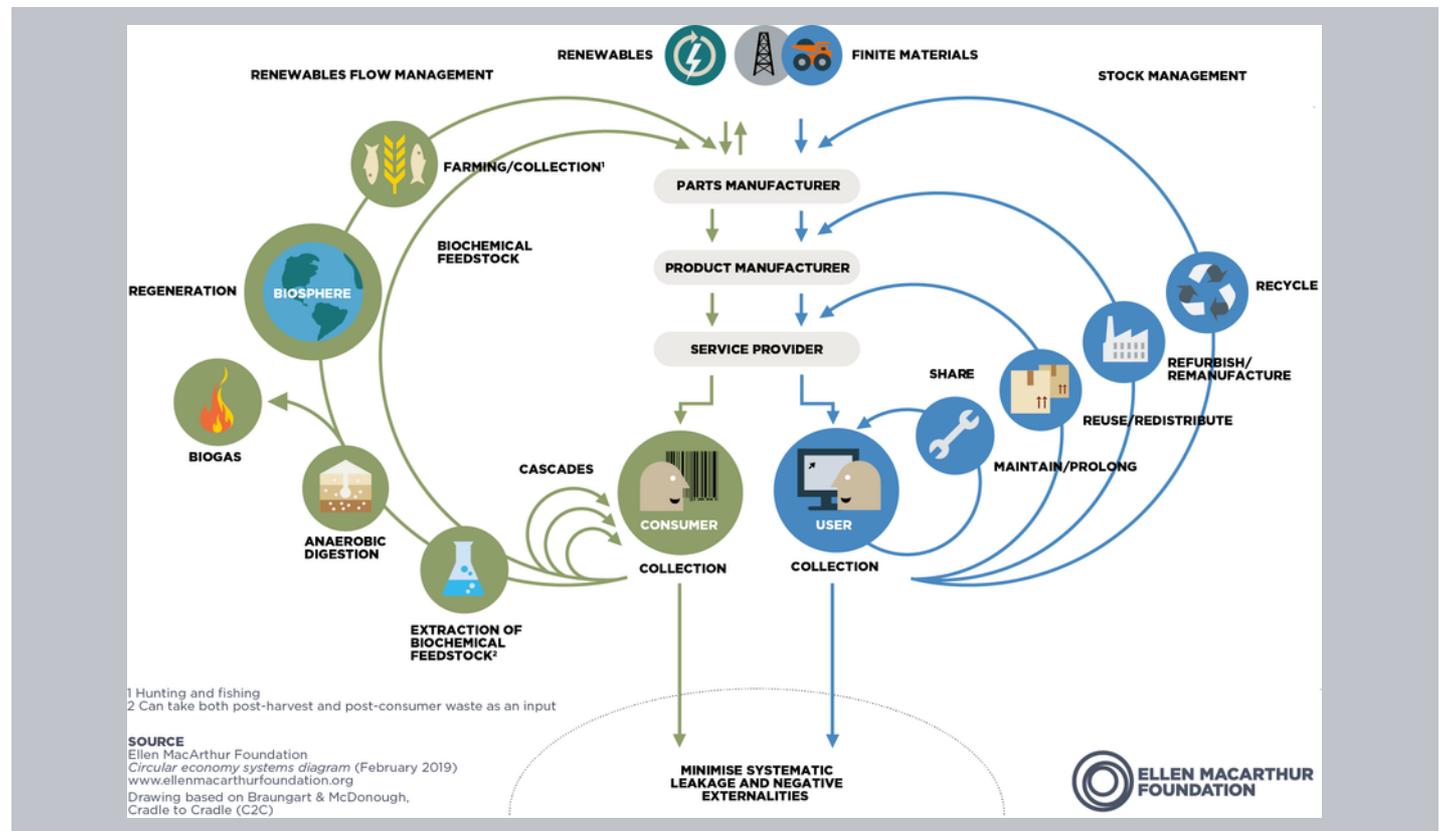
The circular economy promotes an industrial system based on closed loops, stimulating the use of resources in a more efficient and environmentally conscious manner. While the circular economy is a well-known concept today, it is still not the predominant model for resource use. Our world's industrial economy remains largely focused on a linear take-make-dispose model of consumption, where negative environmental impacts are produced and significant value is lost along material chains (The Ellen MacArthur Foundation, 2013). This linear model is incompatible with the finite resources available to us on our planet. On our current trajectory, we would require the resources of three Earths to sustain our resource demands by 2050 (European Parliament, 2022). Despite knowing these facts, there is a long way to go to slow the exponential rise in demand that comes with population growth and an increased quality of life. As global resource use has increased almost eightfold in the last century, supply scarcity risks in the near future are of increasing concern (Rood & Kishna, 2019). Not only will we have to re-evaluate cultures based on excessive consumption, but we will also have to find ways to meet increasing material demands while safeguarding our planet. A way to reduce the demand for new materials is to use resources more efficiently, and through optimal use and re-use (Rood & Kishna, 2019). The circular economy is one model that can help to achieve this.

It is regenerative by design and built on three simple principles: (1) design out waste by optimising products for reuse, (2) separating durable components from consumable components of a product and building all consumable components from biological elements that can be safely returned to the earth, and (3) using renewable energy to fuel this system (The Ellen MacArthur Foundation, 2013).

Closely linked to this, is the concept of Sustainable Materials Management, based on the principles of i) using less materials in the most productive manner ii) reducing toxicity and environmental impact through the material lifecycle and iii) ensuring sufficient resources are available to meet the needs of the future as well as today (Wissingh et al., 2022).

Ellen MacArthur Foundation (n.d.-a) also introduced the so-called "butterfly diagram" as a visualisation of the circular economy system. Within this diagram, two main cycles are seen as driving forces of the circular economy. The biological cycle (left) concerns biodegradable materials that can be returned to Earth, while the technical cycle (right) focuses on products and materials that can be circulated through processes such as reuse or recycling (Ellen MacArthur Foundation, n.d.-a). The biological cycle is more tangible in terms of circularity, for example, recycling paper. However, the technical cycle is ultimately responsible for CO₂ output. Therefore, managing these materials from the start is key.

Ellen MacArthur Foundation: Butterfly Model



Why it matters

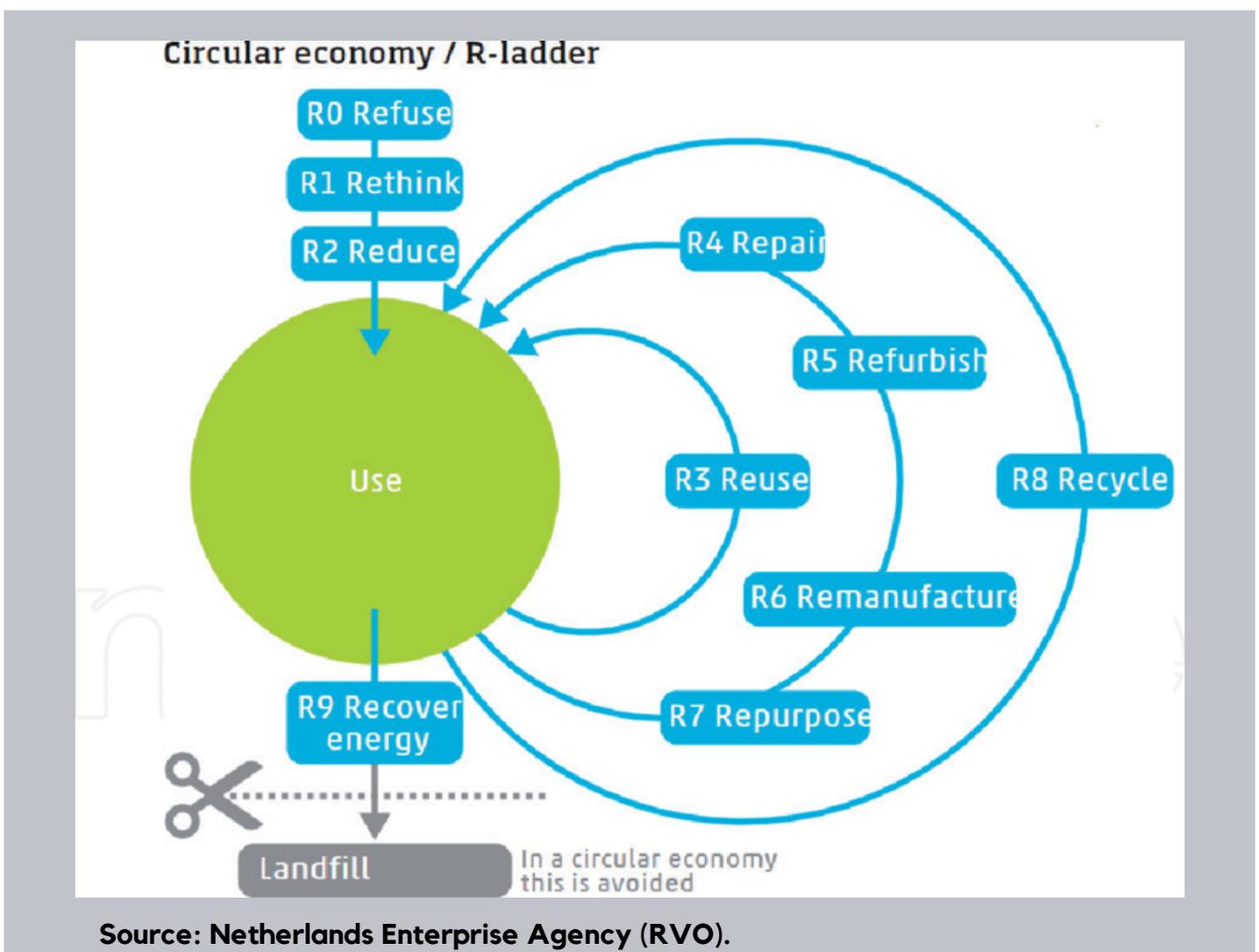
As the circular economy not only promises to dramatically reduce CO₂ emissions and negative environmental impacts, but also to promote economic growth and new jobs, it has already been widely adopted in the action plans of various governments and supranational institutions. The EU, for example, has a Circular Economy Action Plan, supported by a first package of measures designed to speed this transition introduced in March 2022 (European Parliament, 2022). As part of this plan, it is acknowledged that all stages of the value chain must become circular; from the design stage to the final purchase by a consumer (European Parliament, 2022).

Our economic activities drive increased material use to meet ever growing demands. This causes negative environmental impacts such as acidification, climate change, and toxicity, most of which can be attributed to just seven metals and a few construction materials (concrete, sand, and gravel); the environmental impacts of these seven metals are also predicted to double or even quadruple by 2060 (OECD, 2018). In line with this, policy must focus on material inputs, to better understand the negative environmental impacts affected by outputs in our economy. Procurement officers lead the path for integrated business operations, and are therefore, vital to sustainable transitions within organisations and beyond.

From 3 Rs to 10 Rs

Circular economy strategies extend beyond the infamous 3 Rs of reduce, reuse, and recycling, up to 10 Rs (see figure below). The strategies of recover, recycle, repurpose, remanufacture, refurbish, reuse, reduce, rethink, and refuse work together towards the circular economy, although the most common targets of recovery and recycling do not promote the circular economy due to lack of efficacy (Morsetto, 2020).

This is also reflected in the aforementioned butterfly model by Ellen MacArthur Foundation. The inner loops of this model represent an area where the value of a product can be maintained by keeping it whole; in this area, strategies such as sharing, and reusing should be prioritised as the product is worth more whole, the outermost loop representing recycling is seen as a last resort strategy, as this is where the most embedded value of a product is lost by breaking it down (Ellen MacArthur Foundation, n.d.-b).



"In the face of sharp volatility increases across the global economy and proliferating signs of resource depletion, the call for a new economic model is getting louder."

- The Ellen MacArthur Foundation, 2013

Government procurement in the Netherlands

12% of total spendings on products and services in the Netherlands was spent by the Dutch government in 2019, contributing to approximately 12% of the carbon footprint related to consumption expenditure (approx. 22 megatons) (Steenmeijer et al., 2021).

The government of the Netherlands aims to reduce 1 megaton of CO₂ through circular procurement, which involves the consideration of what happens to a product at the end of its life in the procurement stage and putting the product to optimal use again at the end of its life (Ministerie van Infrastructuur en Waterstaat, 2021). Procurement policies are a means of reaching this goal.

Barriers to sustainable public procurement.

While the last two decades have seen environmental issues being placed highly on the political agenda of the European Union,

green public procurement is still a voluntary initiative for member states and their contracting authorities to take on and implement (Pouikli, 2020). The voluntary nature of this effort provides a barrier to meaningful implementation and enforcement, despite good intentions set in the circular economy goals set by the European Union.

Beyond the level of enforcement, barriers to circular procurement are seen on the organisational level relating to organisational culture, personnel, and the need to cater to varying interests. Firstly, a lack of structural implementation and relevant supporting resources stands in the way of circular procurement practices. A circular business operations study on sustainable materials management for procurement managers, for example, found that a clear contract policy for sustainable procurement was lacking and many employees were authorised to place orders without a clear task owner for sustainable procurement, leading to inconsistencies (Wissingh et al., 2022). It was also found that a data infrastructure designed to manage material flows was lacking, making it difficult to integrate sustainable materials management meaningfully into operations (Wissingh et al., 2022). Organisational factors such as a lack of monitoring and evaluation, a lack of incentives, and decentralised procurement are also barriers to implementing circular procurement (Vejaratnam et al., 2020).

This leaves the individual purchaser with the responsibility to make green choices which greatly depend on their ability and motivation to do so; the absence of high-level guidelines to direct purchasing choices, is therefore, another barrier on top of decentralisation (Kristensen et al., 2021).

On the level of culture, a lack of cultural change impedes circular procurement as procurers resist changes to their practices, for example, by focusing on the upfront cost of a product rather than the whole-life costs of a product (Vejaratnam et al., 2020).

The existing culture of risk avoidance within procurement departments also plays into this, as complaints are avoided, and procurement regulations favour legal aspects for which circular criteria are harder to meet (Kristensen et al., 2021). For personnel, a lack of knowledge may also contribute to this resistance. Circular procurement also requires knowledge of the entire supply and value chain, as well as other R strategies that may factor into a purchasing decision, on top of simply buying new products (Kristensen et al., 2021). Furthermore, varying interests also present a challenge in balancing meeting functional and circular objectives, meaning procurement officers often resort to trade-off-based decision making (Kristensen et al., 2021).

Finally, pricing can act as a barrier to sustainable procurement. Waste is budgeted separately within organisations, and thereby excluded from the pricing of a product.

Opportunities for sustainable public procurement.

While changing large scale procurement has proven to be challenging, there are many opportunities for public procurement that begin to push us in the right direction.

The crucial next steps in developing circular public procurement include the incorporation of sustainability issues into policies, strategies, and goals on a local level, focusing on product life cycles, components, and materials (Husgafvel et al., 2022).

Each euro spent on a purchase has varying impacts depending on the product group, e.g., a euro spent on energy has a higher footprint than a euro spent on a service, this means that it is possible to prioritise procurement (Steenmeijer et al., 2021). Identifying areas to prioritise offers an opportunity to make the transition in public spending on circular procurement more manageable. According to research, the fields offering the most promise in promoting circular procurement are construction, waste management and recycling, energy (Husgafvel et al., 2022), wastewater management, transportation, catering, furniture, and textiles (Alhola et al., 2018).

Other sustainable business models can also be leveraged as a means to stimulate more sustainable procurement. For example, the shift of focus from procuring products to services and solutions in the form of product services systems (see box on the next page) is another means to implement circular public procurement (Kristensen et al., 2021).

Research by Nstondé and Aggeri (2021), on how public procurement can influence innovations and markets, found in convergence with previous literature, that public procurement requires cooperation and collaboration with local authorities, in terms of cognitive and technological assistance aimed at embracing innovative procurement. The road to greener public procurement will therefore, be one, paved by many actors forming new collaborations with potential that was previously untapped.

These policy recommendations are further developed based on the ideas of researchers focused on business operations within the research group, Circular Business, at the Centre of Expertise Mission Zero.

As an overarching framework for the following policy recommendations, the circular intervention model by Kuijlenberg & Wissingh (2022) is proposed (see next page). The model describes the appropriate R strategies to employ at the strategic, tactical, and operational levels within an organisation.

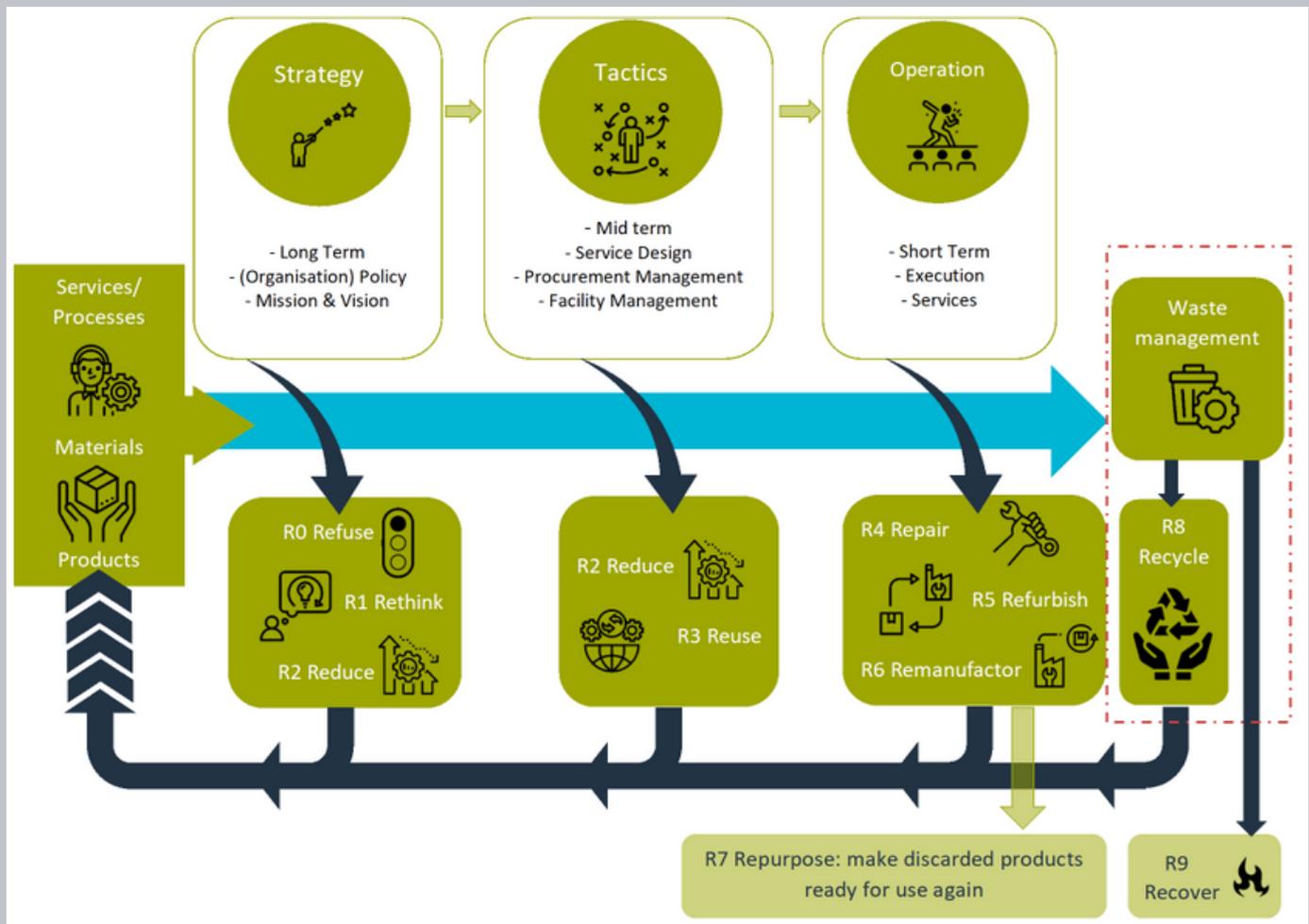
Product Service Systems?

A PSS is an integrated product and service offering that delivers value in use. A PSS offers the opportunity to decouple economic success from material consumption and hence reduce the environmental impact of economic activity”.

- Baines et al., 2007

Implications and Policy Recommendations

The opportunities and barriers to circular public procurement presented in this policy brief provide a basis on which policy recommendations will be made.



Circular Intervention Model (Kuijlenberg & Wissingh, 2022)

Policy recommendation 1

A new hierarchy of R strategies

Refuse, rethink, and redesign should be prioritised over value-decreasing R strategies such as recycling. Furthermore, the R strategies that keep products in use while preserving their value such as reuse, or repair, should be considered before value-decreasing strategies. These should be applied in accordance with the circular intervention model.

Policy recommendation 2

True pricing

As previously discussed, pricing acts as a barrier to sustainable procurement by omitting the cost of waste associated with a product. True pricing considers waste as part of a product's price, with the potential to make unsustainable procurement choices less affordable than they currently are, and thereby making sustainable options the more attractive choice.

This requires an understanding of the varying scopes of emissions, from direct emissions resulting from owned and controlled sources e.g., gas burnt for production on site, to indirect emissions such as electricity used for air conditioning in offices, as well as other emissions from organisational activities through sources they do not own or control, e.g., business travel.

Policy recommendation 3

Material flow passport

Waste can harbour invaluable materials that end up being dumped or incinerated. These materials can easily be reused, however, waste in large volumes can make material recovery difficult. A material passport is a line of data connected to an end product such as a building, where different stakeholders in a supply chain can document the different products and components within the final product (Block et al., 2019).

Identifying and reusing such components can save the associated energy, labour, materials, transportation costs, and the associated emissions of producing entirely new materials (Block et al., 2019).

Policy recommendation 4

Contract management

Procurement contracts tend to cover a long time span, leaving buyers stuck in old ways despite ambitions for sustainability.

Effective and careful contract management can help organisations keep track of the obligations they have to meet, and when contracts expire, to look for opportunities for the type of flexibility needed to enable sustainable transitions. Contract management also gives insight into the totality of a purchasing portfolio, facilitating better purchase planning. In organisations where contracts are concluded in a decentralised manner, this may be more difficult to achieve. Therefore, organisations should make careful decisions about where and how contracts will be managed and by whom (PIANOo, n.d.).

References

Alhola, K., Ryding, S. O., Salmenperä, H., & Busch, N. J. (2018). Exploiting the Potential of Public Procurement: Opportunities for Circular Economy. *Journal of Industrial Ecology*, 23(1), 96–109. <https://doi.org/10.1111/jiec.12770>

Apex Group. (n.d.). Carbon Footprint Assessment. Retrieved July 15, 2022, from https://www.apexgroup.com/apex-esg-ratings/co2-footprint-assessment/?utm_source=google&utm_medium=cpc&utm_campaign=16711458643&utm_content=135201337619&utm_term=scope%203%20emissions&utm_campaign=16711458643&utm_source=google&utm_medium=cpc&utm_content=590123403993&utm_term=scope%203%20emissions&adgroupid=135201337619&gclid=EA1aIQobChMI3tbN07Dp-AIVjYODBx1YUAS9EAAYAAEgJKXPD_BwE.

Baines, T. S., Lightfoot, H. W., Evans, S., Neely, A., Greenough, R., Peppard, J., Roy, R., Shehab, E., Braganza, A., Tiwari, A., Alcock, J. R., Angus, J. P., Bastl, M., Cousens, A., Irving, P., Johnson, M., Kingston, J., Lockett, H., Martinez, V., . . . Wilson, H. (2007). State-of-the-art in product-service systems. *Proceedings of the Institution of Mechanical Engineers, Part B: Journal of Engineering Manufacture*, 221(10), 1543–1552. <https://doi.org/10.1243/09544054jem858>

Block, M., Schouten, N., & Dasnois, M. (2019, November 25). Materials passport for a circular economy. *Metabolic*. <https://www.metabolic.nl/news/circular-economy-materials-passports/>

Ellen MacArthur Foundation. (n.d.-a). The butterfly diagram: visualising the circular economy. <https://ellenmacarthurfoundation.org/circular-economy-diagram>

Ellen MacArthur Foundation. (n.d.-b). The technical cycle of the butterfly diagram. <https://ellenmacarthurfoundation.org/articles/the-technical-cycle-of-the-butterfly-diagram>

European Parliament. (2022, April 26). How the EU wants to achieve a circular economy by 2050. *European Parliament News*. <https://www.europarl.europa.eu/news/en/headlines/society/20210128STO96607/how-the-eu-wants-to-achieve-a-circular-economy-by-2050>

Husgafvel, R., Linkosalmi, L., Sakaguchi, D., & Hughes, M. (2022). How to advance sustainable and circular economy-oriented public procurement—A review of the operational environment and a case study from the Kymenlaakso region in Finland. *Circular Economy and Sustainability*, 1, 227–277. <https://doi.org/10.1016/b978-0-12-819817-9.00015-6>

References

Kristensen, H. S., Mosgaard, M. A., & Remmen, A. (2021). Circular public procurement practices in Danish municipalities. *Journal of Cleaner Production*, 281, 124962. <https://doi.org/10.1016/j.jclepro.2020.124962>

Ministerie van Infrastructuur en Waterstaat. (2021, December 23). Accelerating the transition to a circular economy. Government of the Netherlands. <https://www.government.nl/topics/circular-economy/accelerating-the-transition-to-a-circular-economy>

Morseletto, P. (2020). Targets for a circular economy. *Resources, Conservation and Recycling*, 153, 104553. <https://doi.org/10.1016/j.resconrec.2019.104553>

Ntsondé, J., & Aggeri, F. (2021). Stimulating innovation and creating new markets – The potential of circular public procurement. *Journal of Cleaner Production*, 308, 127303. <https://doi.org/10.1016/j.jclepro.2021.127303>

OECD. (2018, October). OECD Highlights Global Material Resources Outlook to 2060. <https://www.oecd.org/environment/waste/highlights-global-material-resources-outlook-to-2060.pdf>

PIANOo. (n.d.). Inrichten en uitvoeren van contractbeheer. PIANOo - Expertisecentrum Aanbesteden. <https://www.pianoo.nl/nl/inkoopproces/fase-3-uitvoeren/inrichten-en-uitvoeren-van-contractbeheer>

Pouikli, K. (2020). Towards mandatory Green Public Procurement (GPP) requirements under the EU Green Deal: reconsidering the role of public procurement as an environmental policy tool. *ERA Forum*, 21(4), 699–721. <https://doi.org/10.1007/s12027-020-00635-5>

Rood, T., & Kishna, M. (2019). Outline of the Circular Economy. PBL Netherlands Environmental Assessment Agency. <https://circulareconomy.europa.eu/platform/sites/default/files/pbl-2019-outline-of-the-circular-economy-3633.pdf>

Steenmeijer, M. A., van der Zaag, J. D., Corts, J. C., Tauber, J. M., Hollander, A., van den Berg, T., van der Zande, C. P. L., & Zijp, M. C. (2021). The environmental impact of EUR 85 billion in annual procurement by all Dutch governments (No. 2021–0220). RIVM. <https://rivm.openrepository.com/handle/10029/625417>

References

The Ellen MacArthur Foundation. (2013). Towards the circular economy Vol. 1: an economic and business rationale for an accelerated transition (No. 1). <https://ellenmacarthurfoundation.org/towards-the-circular-economy-vol-1-an-economic-and-business-rationale-for-an>

Vejaratnam, N., Mohamad, Z. F., & Chenayah, S. (2020). A systematic review of barriers impeding the implementation of government green procurement. *Journal of Public Procurement*, 20(4), 451–471. <https://doi.org/10.1108/jopp-02-2020-0013>

Wissingh, T.F., Kuijlenburg, R., Joosstens F., Poldner, K.A., Mobach, M.P. (2022) Principals and Suggestions for Sustainable Materials Management within Facility Management. The proceedings of the 21st EuroFM Research Symposium 2022, European Facility Management Network, 15-16 June 2022, Breda, the Netherlands.

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