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Circular Public Procurement in the Netherlands: An Empirical Assessment of Its Environmental and Economic Implications

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Abstract
This research aims to examine how circular public procurement acts as a strategic tool to help the shift towards a circular economy, concentrating on the Netherlands experience as a top example in embracing sustainable practices, encouraging innovation, and reaching a balance among economic, social, and environmental factors. It also reviews the most important circular economy practices in the Netherlands by analyzing the mechanisms adopted to integrate circularity criteria into public policies.
The study adopted a descriptive analytical approach, through a literature review, with a focus on the Netherlands case as a reference experience. Public procurement policies and mechanisms for integrating sustainability criteria, such as life cycle assessment, and criteria for reuse and recycling within public contracts, were analyzed. The results of the analysis showed that the Netherlands experience is based on an integrated institutional framework and effective coordination among stakeholders, which enabled the market to be guided towards circular production models. It also demonstrated that circular public procurement contributes to waste reduction, improved resource efficiency, and stimulates innovation and the creation of new economic opportunities.
Keywords: Circular economy, public procurement, Netherlands.

1. Introduction

The transition towards sustainability represents one of the most significant challenges confronting modern economic systems, particularly in light of finite natural resources and escalating environmental pressures. For an extended period, the linear model based on 'extract-produce-consume-dispose' has predominated; however, its detrimental impacts have necessitated the adoption of a circular economy model, which aims to minimize waste and maximize resource efficiency. Within this framework, public procurement has emerged as a pivotal economic instrument employed by governments to steer markets and achieve sustainable development goals. Its role extends beyond merely fulfilling public sector needs to encompass supporting innovation, fostering social inclusion, and incentivizing organizations to embrace responsible practices.

As public procurement has evolved, what is known as sustainable public procurement, and subsequently circular public procurement, has emerged. The latter specifically focuses on integrating circular economy principles into supply chain operations, through the adoption of criteria such as reuse, extending product lifecycles, and reducing environmental impact across various stages. The Netherlands experience stands as a leading example in this domain, having successfully leveraged public procurement policies as a strategic tool to support the transition towards a circular economy. This has been achieved through the development of advanced regulatory frameworks, enhanced cooperation among stakeholders, and the adoption of precise criteria for sustainability assessment. These efforts have contributed to achieving a balance between economic and environmental dimensions, while simultaneously generating new opportunities for growth and innovation. Accordingly, this study aims to examine how circular public procurement helps in moving towards a circular economy, especially looking at the Dutch experience and the identification of important lessons that can be applied.

This research stems from its engagement with one of the most prominent contemporary transformations in economic thought: the transition towards a circular economy, with a specific focus on the role of circular public procurement as a strategic tool for achieving sustainability. Its significance is further amplified by the analysis of the Netherlands experience as a pioneering model from which valuable lessons can be drawn, especially given the efforts of numerous countries to balance economic growth with environmental protection, reduce waste, and maximize resource efficiency. It also aims to gather useful lessons and insights from the Netherlands' experience, thus aiding in the creation of effective policies in this area.

2. Conceptual background

One of the main economic activities of governments is public procurement (PP). It describes how governments or public sector organizations purchase goods and services through a public contract, enabling them to carry out their duties and provide their services.. (Witjes & Lozano, 2016, p. 38) Public procurement also describes the government's and state-owned firms' purchases of materials, labour, and services. Public procurement is crucial to the development, stability, and success of small and medium-sized businesses anywhere in the world (SMEs). The procurement sector accounts for about 70% of developing country budgets and 35% of those of wealthy countries. (Thomas & Biraori, 2026)

In the European Union, public procurement is subject to a number of Community laws, such as the Procurement Directives (e.g. 2004/24/EC and 2004/25 / EC), Treaties (e.g. Treaty on the Functioning of the EU), European Strategies and Policies (e.g. EUROPE 2020, Public Procurement for a Better Environment, Closing the Circle - An Action Plan for the Circular Economy, Roadmap for the Efficient Use of Resources in Europe, Energy 2020, Eco-Labeling, etc.), Jurisprudence of the Court of Justice of the European Communities and related laws on 'competition' and 'State aid'. (Karnavos, Mitoula, Tragaki, & Apostolopoulos, 2022, p. 567)

Public procurement it is the state itself, state actors, at different levels, that can influence the market directly by demanding something new or absorbing innovations that struggle to take off, but are potentially of broader benefit to societies. (Edler, 2023, p. 1) the market can be motivated to create more circular products and use circular business models. This buying power

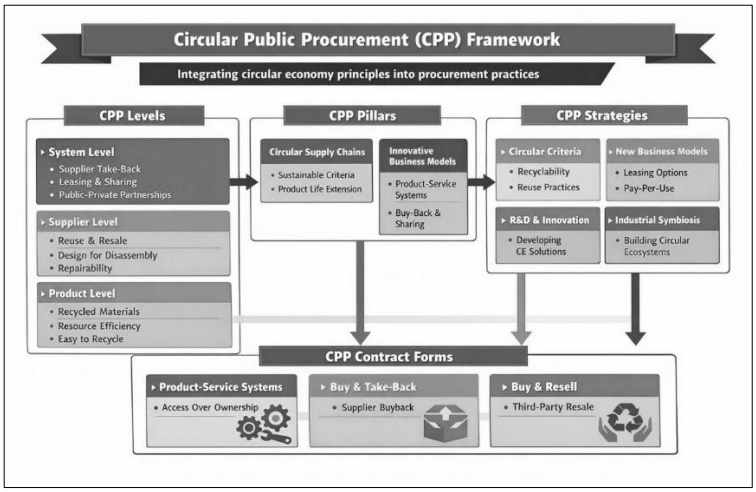
is substantial, as government spending in different countries varies from about 12% to 22% of gross domestic product (GDP). (Cramer, 2024, p. 1)

public procurement policies have been long recognised as potential promotors of production efficiencies, innovation and business capacity building, as well as acting as demonstrators for novel products and services. A number of studies have explored the use of strategic purchasing to promote specific economic and social equity goals, including targeting local businesses and minority entrepreneurs. (Morley, 2021, p. 3)

Circular Public Procurement (CPP), is "the purchasing of works, goods or services by a public authority for use in the pursuit of closed-loop energy and material systems along entire supply chain processes with the least possible adverse environmental impact and waste generation". (Zijp, et al., 2022, p. 2) Circular procurement from a procurers point of view means; in addition to promoting the six "Rs" (re-use, recycle, repair, refurbish, remanufacture, recover), as well as encouraging demand for products with positive contributions to CE. Circular procurement also implies that the procurer shall guarantee that the products obtained by it will be treated after its useful life and that they can be repaired and then broken down into components/sub-components/materials which may be re-used. (Alhola, Ryding, Salmenperä, & Busch, 2018, p. 2) Procurement involves more than just buying circular products; it also requires considering how the product will be used in a circular manner. Simply purchasing a recycled product is not enough, as its disposal in a landfill would not be considered circular. To ensure circularity, it is important to determine how the product can be reused, repurposed, or dismantled in what is known as the up/down cycle. This approach distinguishes circular economy from recycling. (Dumitrica, Grigorescu, & Davidescu, 2023)

Circular public procurement (CPP) is a strategic approach to promote circularity in the procurement process of the public sector with the aim of reducing environmental impacts and improving resource efficiency in supply chains **(Figure 1)**. CPP has been defined by means of four interconnected dimensions: levels, pillars, strategies and contract types, that describe both the level of intervention within the procurement process and its focus on different aspects of the relationship among system, suppliers and products (e.g., reusing, recycling, designing for disassembly).

Figure 1. Overview of different CPP concepts.



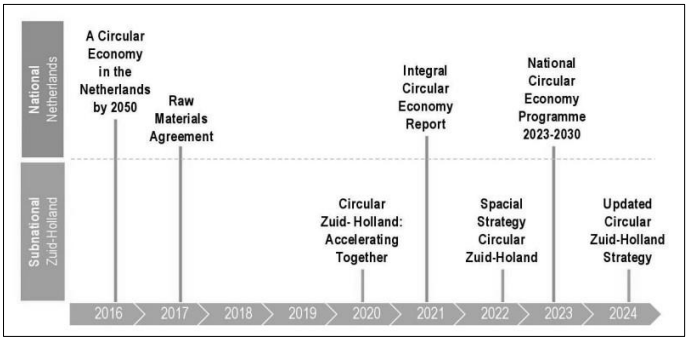
Source: Authors owns elaboration based on (Kristensen, Mosgaard, & Remmen, 2021)

Circular economy principles can be embedded in each component of public sector purchasing processes. A new model has been developed – Circular Public Procurement (CPP) model – and is outlined below:

- **Levels**:
- system level: take back from suppliers, leasing models; public private partnerships etc;
- supplier level: reuse, resell, reparable products & design for disassembly etc;
- product level: recycled content, resource efficiency, recyclable etc.
- **Pillars**:
- circular supply chains that support sustainable criteria & extend product life;
- innovative business models e.g. Product service systems (pss); buy back/ sharing schemes etc.
- Strategies
- incorporate circular criteria in procurement process;
- promote research & innovation;
- implement service-oriented business models;
- develop industrial synergy.
- Contractual forms
- product-service systems;
- purchase & take-back agreements;
- resale mechanisms.

The Netherlands has implemented an integrated and strategic policy for developing a complete circular economy by 2050. The timeline represents the steps that have been taken from 2016-2024 at both the national and sub-national levels (Zuid Holland) within a multi-level governance structure **(Figure 2)**. These steps include establishing a long term strategic goal at the national level in 2016 as part of the overall "circular economy" vision; the 2017 Raw Material Agreement to support sustainable use of resources; an analysis of circular economy development and challenges in 2021 based on the report titled "Integrated Circular Economy"; and, at the national level, a 5 year plan (2023-2030) outlining specific activities to develop a full circular economy. The region of Zuid Holland has also developed additional initiatives related to circularity such as the 2020 "Accelerate to Circularity" program; the inclusion of circular economic principles into regional spatial plans in 2022; and updating of their regional circular economic strategy in 2024.

Figure 2. Circular economy policy timeline in Zuid-Holland, Netherlands.



Source: (Hedley, 2023)

2.1. Environmental implications of circular public procurement

Circular public procurement can greatly help in promoting circular business models by demanding eco-friendly products and further circularity targets in partnership with suppliers. (Tátrai & Diófási-Kovács , 2021, p. 526) in this context, Public Authorities may use a circular product purchasing strategy as one means of reducing their environmental impact while maintaining sustainable consumption and production patterns with respect to the planetary boundaries. (Iurascu, 2024, p. 2)

The application of circular procurement principles in public authorities can provide several advantages for those applying these principles. For example, it will increase transparency; however, in addition to the lower price being the only factor to be considered when making a purchasing decision, it will result in greater social and environmental benefits. As such, circular procurement allows for the meeting of environmental and social standards through defined measurable specifications and moving beyond a focus on "lowest price" when making a purchasing decision. (Jonášová, et al., p. 21) The main objective of Socially Responsible Public Procurement, as defined by the European Commission is to consider the effect of all products, services and works purchased by the public sector on society. It acknowledges that in addition to being interested in achieving the best price and best value for money through purchasing practices, public purchasers have a responsibility to ensure that their purchasing activities produce societal benefits and mitigate negative social consequences associated with the execution of contracts. (Carvalho, 2025, p. 13)

Furthermore, Circular public procurement allows public organizations to help achieve the aims of state environmental policy, like lowering greenhouse gas emissions, enhancing energy and water efficiency, decreasing production and consumption waste, and increasing the safety of final products. (ROLEDERS , 2022, p. 141) in addition, it operates as a life-cycle–based decision mechanism that shifts influence upstream to the design stage, ensuring that environmental criteria and material circularity are embedded across all phases of a product's life cycle, from production to end-of-life. (Alhola, Ryding, Salmenperä, & Busch, 2018)

The Netherlands is regarded as one of the top countries that has made important strides in the area of the circular economy and the inclusion of environmental factors into government policies, having gone past just accepting sustainability ideas toward a complete and actionable application including policies, regulatory structures, and economic tools, consistent with its national goal to reach a fully circular economy by 2050. (Government of the Netherland , 2025) The Dutch national government passed in 2005 an order through their annual spending authority, that they would make efforts to increase demand for environmentally-friendly products and services by using their own purchasing practices as examples to follow. This led to development of a plan for green purchases at the national level of government, which also included local governments and provincial governments. Sustainable public purchase is now being pursued as a multi-faceted policy in The Netherlands. (Grandia & Voncken, 2019, p. 2)

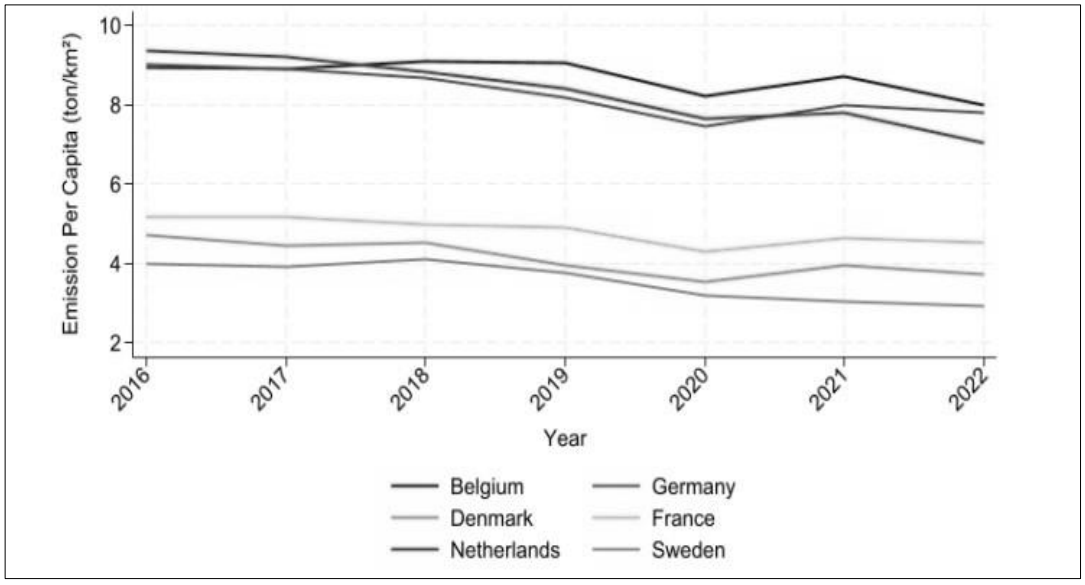
According to (OECD, 2024) in the Netherlands, public procurement constitutes a powerful instrument through which the state directly shapes market dynamics. With an annual procurement volume of approximately €85 billion, the government acts as a dominant market player capable of steering demand towards environmentally sustainable goods and services. By

embedding sustainability criteria—such as emission reduction, use of recycled materials, and lifecycle performance—into tendering procedures, public authorities effectively compel suppliers to comply with environmental standards. This approach not only influences supply structures but also contributes to restructuring the market towards greener and more circular production systems.

The Dutch approach to sustainable public procurement relies on specialized tools that enable the integration of environmental criteria into tendering processes. Key instruments include the CO_2 Performance Ladder, a green procurement tool that supports organisations in reducing carbon emissions and embedding sustainability within procurement practices, and DuboCalc, which assesses the environmental impact of infrastructure projects. These tools allow contracting authorities to operationalise environmental objectives and drive decarbonisation across supply chains through procurement mechanisms. (IISD, 2024) The system was created by SKAO (Foundation for Climate-Friendly Procurement and Business) and each year SKAO evaluates how much each member organisation has reduced their greenhouse gas emissions. SKAO can use third party audits so that public procurers don't have to check if the companies are meeting their commitment. When an enterprise fails to meet its target as specified in the project call for tenders, it shall repay the advantages received by them 1.5 times. (OECD, 2022)

According to (European Commission, 2024) The Ministry of Economic Affairs and Climate Policy in the Netherlands is in charge of developing the public procurement strategy used by other government departments. It also encourages innovative public procurement through its Expert Centre PIANOo by offering guidance, information, and examples of best practices. Furthermore, national innovation procurement is backed by the Ministry of the Interior and Kingdom Relations, which manages information technology procurement, and the Ministry of Infrastructure and Water Management, which handles areas like transport, infrastructure, and water management.

Figure 3. Emission per capita across countries (2016–2022)

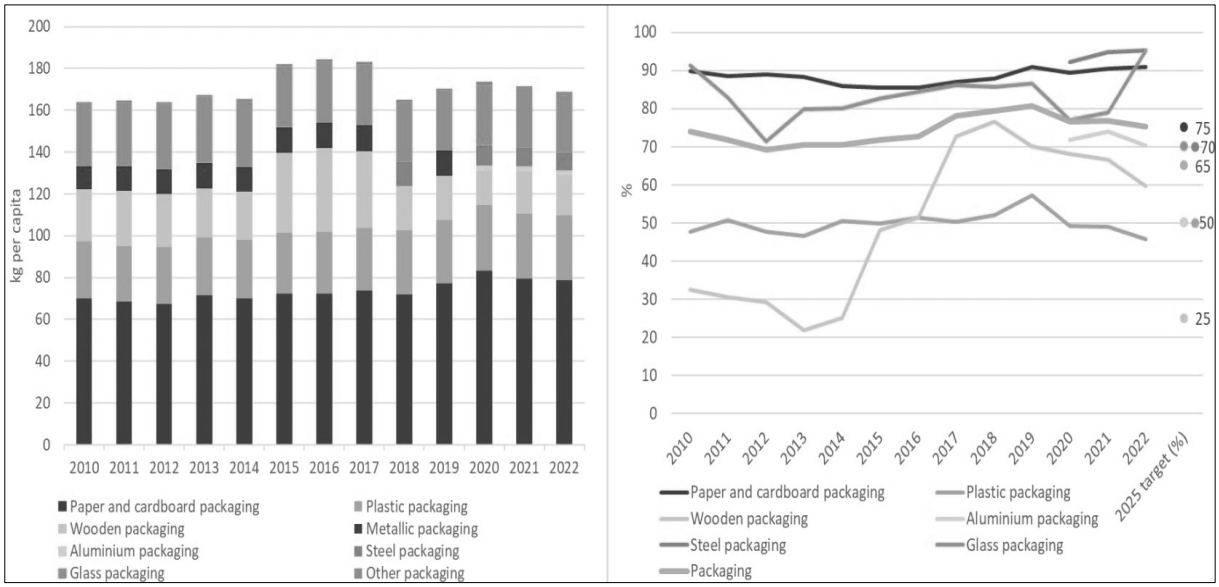


***Source*:** (Titl, 2025, p. 4)

The Netherlands is one of the nations that has demonstrated a big decrease in emissions since 2016 **(Figure 3)**, where it was at approximately 9 t/km²; then it continued to decrease, especially since 2018, and had reduced by about 20% (to approximately 7 t/km²) by 2022. The decrease in emissions by the Netherlands clearly shows that there are positive effects of its circular economy policies. Although the Netherlands started with higher emissions than some other countries such as Germany; however, due to an ongoing reduction in emissions, the country's emissions per capita have been comparable to those of Germany for many years now. As this corresponds to the commitment of the Netherlands towards circular economy and integrating environmental issues into government policy.

Waste policy is a key aspect of moving towards a circular economy. With a 78% recycling rate of waste handled in the Netherlands, the nation is among the leaders in Europe and only a small amount of waste is sent to landfills. (Hanemaaijer, et al., 2023, p. 22)

Figure 4. Packaging waste generation (left) and recycling rates (right), 2010-2022



Source: (European Enivironment Agency, 2025)

The amount of packaging waste generated on average per person in the Netherlands for the time frame 2010-2022 has remained consistent at best, and slightly increased **(Figure 4)** indicating that there is still an abundance of packaging being consumed. The majority of this packaging waste is comprised of paper/cardboard. Plastic represents a second large portion of packaging waste. Materials like glass and metal make up the remaining proportion of packaging waste. Packaging waste recycling also demonstrates a very high rate for all of these categories. Paper and cardboard recycling rates range between 85% and 90% annually. Glass recycling rates and steel recycling rates are similar to those of paper/cardboard and typically range between 80% and 90%. Aluminum recycling rates have been steady around 70% and 75% over the past decade. However, plastic recycling rates have improved significantly, rising from under 30% to over 50% since 2022. While wood recycling rates are significantly lower than some of the other material types listed above (approximately 45%-60%) they are showing a trend upwards starting after

2015. Several of the material types mentioned above have either met or will meet their respective recycling targets set by 2025 (for example, 75%, 70%, and 65%). These results reflect both effective waste management policy/strategies and resource efficient methods employed in order to support the Dutch government's goal of becoming a completely closed-loop/circular economy by 2050.

2.2. Environmental implications of circular public procurement

The circular economy shows great promise in achieving sustainability objectives. CE's major waste reduction abilities result in improved environmental performance and industrial effectiveness. (Rasheed, et al., 2024, p. 2) Circular public contributes to the enabling conditions of a system that provides value and social well-being while maintaining resources at their best possible value over their entire existence, ultimately producing a regenerative economy. (Endris & Abate , 2024, p. 11) Transitions to circular economies (CEs) require actions from all actors in society including public authorities, who can have a critical role as a result of their purchasing power and economic significance. In the EU, for example, public procurement – the processes by which public authorities purchase works, goods, or services – accounts for around 14% of GDP. (Steenmans & Muscaritoli, 2026, p. 292) Sustainable economic growth means the steady increase in an economy's ability to produce goods while protecting social fairness and the environment. Public procurement directly affects this growth by directing large amounts of money into key areas like infrastructure, energy, and manufacturing, thus boosting overall demand and encouraging structural change. (Mutangili , 2025, p. 38)

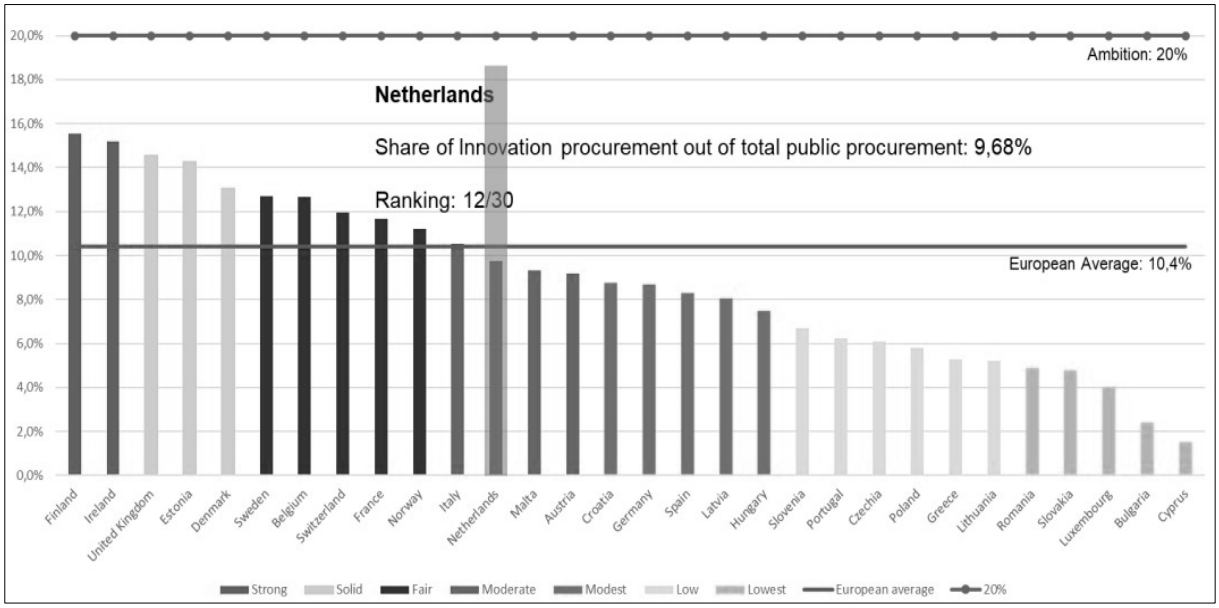
In economic terms, the circular public procurement approach involves estimating the full value of the product life cycle, which provides an objective assessment of the economic benefits or losses of the subject of procurement and the effectiveness of public procurement. (ROLEDERS , 2022, p. 141) Circular public procurement generates significant economic implications by leveraging economies of scale associated with high-value contracts, which enhance production efficiency and reduce unit costs for suppliers. This, in turn, incentivizes firms to invest in environmental innovations and adopt circular economy practices. Moreover, large and predictable procurement demand reduces market uncertainty, thereby strengthening suppliers' willingness to engage in long-term sustainable investments. Public procurement thus operates as a demand-side policy instrument that can stimulate innovation and market transformation. (Guo, 2025)

Circular Public Procurement (CPP) serves as a strategic driver for sustainable economic growth, with its benefits extending beyond environmental considerations to directly and positively influence Gross Domestic Product (GDP) through several key economic mechanisms. Firstly, CPP actively stimulates innovation and fosters new markets. Governmental demand for sustainable products and services compels businesses to develop innovative solutions and circular business models, thereby creating new economic sectors and enhancing value-added contributions to the economy. (Boonman, Verstraten, Weijde, & Hendrik, 2023) Secondly, these procurement practices generate a significant multiplier effect; public expenditure on circular products and services catalyses secondary economic activity within local supply chains, leading to an overall increase in GDP that surpasses the initial outlay .(Karlovsek, Meath, Miles-Mwangang, MacDonald, & Brockmann, 2023) Furthermore,

CPP contributes to increased resource efficiency and productivity by reducing reliance on virgin raw materials and promoting reuse and recycling. This diminishes production costs and enhances corporate profitability, which positively reflects on aggregate economic growth. (Busu & Trica, 2019) Lastly, circular economy activities, such as repair and refurbishment, lead to the creation of new local employment opportunities, often labor intensive. This boosts household income and consumer spending, both vital components of GDP. (Ulian, Cojocaru, Rusu, & Ecaterina , 2020) local context indicators such as i) type of local government units (TYP); ii) income per person level (TIP); iii) spending per person level (TEP); iv) population count (INH); v) protected areas in hectares (LPP); vi) deficit per person level (IND); vii) involvement of LGUs in aiding local sustainable development process (SUS) or viii) management model of LGUs (MOD) might affect the number of awarded circular public procurements. (Godlewska & Godlewski, 2024, p. 2)

In the Netherlands, innovation procurement is embedded in four horizontal policies: public procurement policy, economic policy, R&D policy and innovation policy. (European Commission, 2024) The Netherlands is well-positioned to make the economy more circular—and to profit from it. A circular economy strengthens the Dutch competitive position, results in a cleaner environment, and improves the security of supply of raw materials. (Rood & Hanemaaijer, 2016)

Figure 5. investments on innovation procurement across Europe

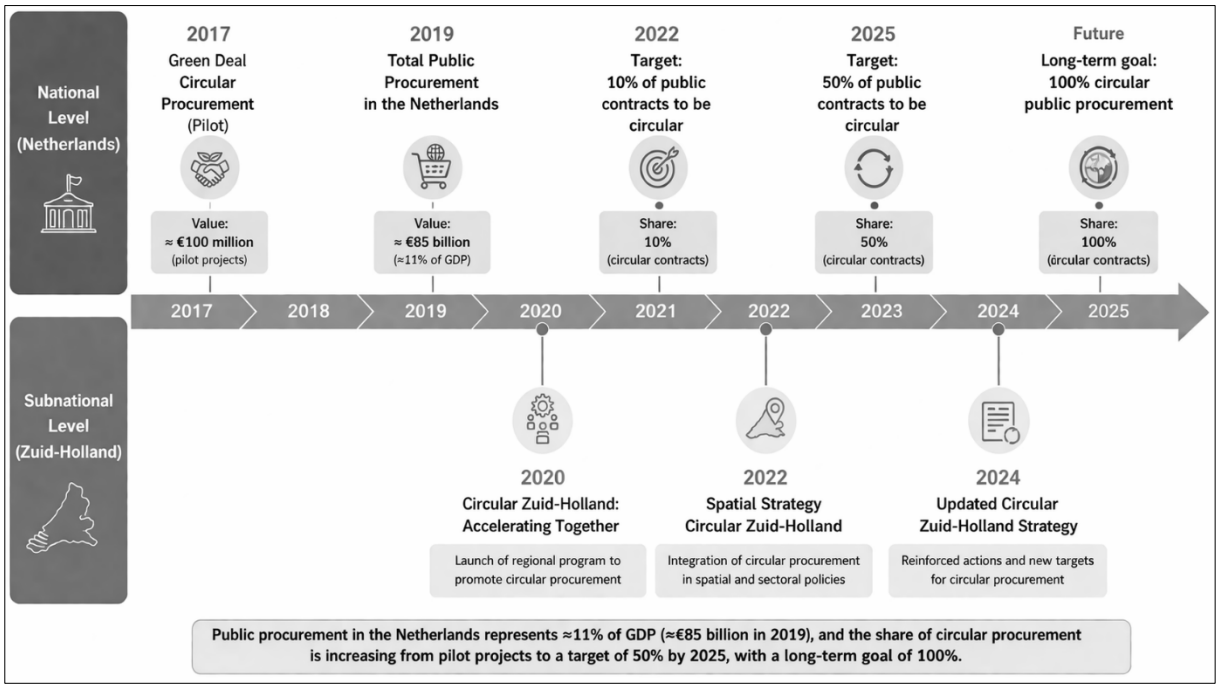


Source: (European Commission, 2024)

The Netherlands stands compared to the EU average (10.4%), and its own goal of 20%. **(Figure 5)** Innovation procurement was found to be higher than the EU average in many countries -- including both Ireland and Finland -- but less than the EU average in the Netherlands, at about 9.68%. Thus, although the Netherlands had a good (but not great) rate of innovation procurement relative to other EU member states, they have adopted the rather high goal of achieving 20% by way of innovation procurement. The relatively low level of innovation procurement in the

Netherlands, when compared to their stated goals, will likely require them to increase investment into more innovative ways of conducting public business.

Figure 6. Integrating Circular Economy Criteria into Public Procurement Contracts in the Netherlands



Source: Authors owns elaboration based on (Wolde , 2013) (Cramer, 2024) (OECD , 2024) (Government of Netherlands, 2025)

the Netherlands has established a comprehensive strategic roadmap and progressive targets for circular public procurement, which details initiatives at both national and subnational (Zuid-Holland) levels **(Figure 6)**. Nationally, the endeavor began with the Green Deal Circular Procurement pilot in 2017, encompassing approximately €100 million in pilot projects. By 2019, the total public procurement in the Netherlands amounted to an estimated €85 billion, representing about 11% of the national GDP. Subsequent national targets aim for a substantial increase in circular contracts, targeting 10% by 2022 and an ambitious 50% by 2025, with the ultimate long-term objective of achieving 100% circular public procurement. Parallel to these national efforts, the subnational level in Zuid-Holland launched its 'Circular Zuid-Holland: Accelerating Together' program in 2020, focusing on regional initiative development. This was succeeded by the integration of circular procurement into spatial and sectoral policies through the Spatial Strategy Circular Zuid-Holland in 2022, further strengthened by an updated strategy in 2024 that introduced new targets. This overarching framework demonstrates a clear progression from initial pilot projects towards the full integration of circularity within public procurement practices.

3. Conclusion

Circular public procurement in the Netherlands has changed from just an environmental tool into a complete economic governance system that can reform market structures and promote institutional innovation. The findings show that adding circularity criteria in public tenders

effectively guides suppliers toward more resource-efficient and sustainable production methods, while ensuring a fair combination of environmental, economic, and social aspects. Additionally, the success of the Dutch experience is strongly based on having a clear institutional framework, using strong assessment tools—like life cycle evaluation—and effective coordination among key stakeholders. However, the wider adoption of this model is still limited by several challenges, including a lack of technical expertise, complicated procedures, and the ongoing presence of traditional procurement attitudes. Therefore, expanding circular public procurement needs to improve institutional and administrative capabilities, systematically making circular criteria mandatory in tender specifications, and boosting cooperation between public and private sector players.

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