



# CDW Replication Package 9

## Business cases

Capital Region of Denmark | ICLEI Europe



# Business cases

The industrial sector traditionally seizes all the opportunities to optimise each step of the production system in a linear market model, developed on a principle of abundant and available raw primary resources, without including in the final price the cost of environmental and social damages. “Closing the loop” and transitioning to a circular economy entails the development of new economic activities, by shifting the value chains of today's world, which are still structured in a linear way.

The CityLoops project has focused on supporting the demonstration actions with sound business cases that have ensured economic viability. This replication package contains various business cases from different demonstration actions. For each developed business case, the project has been looking at cost structures and revenue streams, identifying potential customers (or end-users) and evaluating internal capacity. The examples also rely on market assessments, in particular in comparison to non-circular (or rather linear) alternatives, and include environmental, climate and social evaluations.

This replication package on Business cases is part of a series of nine replication packages, developed by CityLoops. The replication packages address specific actions within the circular construction value chain and how they relate to the work done in CityLoops. The replication packages aim to give cities an in-depth overview of the main elements to consider during each specific step of a circular construction/demolition project. A list of all replication packages can be [found here](#).

## Recommendations from lessons learnt

There are many ways to consider if the business cases were successful, as it depends on the indicators to measure their success (economic, but also social and environmental). The economic profit, or at least the balance, remains crucial to achieve the upscaling of these innovative approaches. Even though the contexts, the cases, the steps of the value chain and the materials were different, there are common rules to underline:

- Cooperation with private companies, willing to innovate is easier to implement when public and private entities work hand in hand. Although the drivers can be environmental, local authorities also need to rely on companies that develop competitive solutions. The successful business cases demonstrate that partnerships between local authorities, public clients and private companies willing to develop circular solutions are a key success factor.
- Early market dialogue is required. It ensures the pre-selection of companies that public procurers can cooperate with, once the tendering process is launched.
- National context and demand: the national regulatory framework plays an important role in promoting circular profitable business models. By pushing demand, it drives suppliers to develop competitive circular products or services and to align the prices on linear solutions. In a free market, it is important to give incentives to shape the national

market. Local authorities have the capacity to influence the national context and regulatory framework. By leading the transition with experimental projects, the demand for circular products and buildings will increase, and the market will more and more change accordingly.

- Risk management and responsibility analysis: Effective risk management is a critical component of the planning process in circular projects. The client should conduct a risk mapping exercise at the outset of the project to identify any risk elements, highlighting the responsibilities, risks, and consequences along the project. This might help to minimise the negative impacts of a triggered risk. It is recommended to maintain this open dialogue with key actors in the value chain proactively and transparently from the early stage of the project.
- Circular competitive business cases already exist: depending on the national context, the stream conditions, access to natural (virgin) resources, price formation etc., some demonstration actions have showcased that circularity could be competitive:
  - Recycling concrete can either be done for approximately the same cost as using new concrete, or it can generate savings if crushed and reused on-site (Roskilde, Høje-Taastrup and Mikkeli).
  - Keeping soil on-site or reusing it locally generates large economic and CO2 savings from reduced transport (Apeldoorn, Høje-Taastrup, Roskilde and Bodø).
  - Using a local deposit for intermediate storing of masses can be a good business case (Apeldoorn, Høje-Taastrup, Roskilde and Bodø).
  - Soft stripping and proper organisation can create business for reuse of demolition items of certain quality – often competitive with new items (Mikkeli).

## CityLoops instruments

Both instruments developed in the context of this replication package can be used as inspiration for creating and evaluating business models and cases.

- The report [Business Cases for Circular Construction & Demolition Projects](#), from the Danish Association of Construction Clients, is an introduction to the circular economy and market in the construction sector. It includes a comparison to the conventional linear market and introduces a two tracked business case mode. This model looks at both the economic/commercial value chain and a broader value chain seen from a societal point of view with environmental, social, and economic aspects of the business case – as two sides of the same coin.
- The report [Developing a circular business model for the municipality of Apeldoorn](#), from SAXION University, is a locally pointed, academic analysis of [The Triple Layered Business Model Canvas](#).

## CityLoops demonstration experiences

The demonstration actions have been used for studying business cases on the ground. To ensure replicability and to highlight the challenges faced and the success factors, reports on different materials and steps of the value chain have been produced:

- **Apeldoorn:** The reuse of road foundation, old concrete pavers for parking and concrete paving slabs for flat roof photovoltaic systems has been investigated, calculated and valorised. By reusing available materials, a total reduction of 78% of greenhouse gas emissions on materials and their transport to the project could potentially be realized. In the case of Apeldoorn, the decision to use a very specific type of street paver, which was not available in reused form, led to the reduction in the Griffiersveld project of 49 tonnes CO2 equivalents, or 17% of the greenhouse gas emissions.  
Read about Apeldoorn's [experience here](#).
- **Bodø:** Different alternatives for mass treatment and transport at a road development project in the midtown have been explored and analysed, finding greater savings in the solutions where reuse is practiced, either at an intermediate storage facility or at the waste management facility.  
Read about Bodø's [experience here](#)
- **Høje-Taastrup:** The recycling of crushed concrete as aggregate in a new construction (Town Hall foundation) and reuse of excavated soil in the Taastrupgaard field have been evaluated positively, primarily related to the fact that the costs of recycling and re-use of concrete and soil in these cases have not been higher than the market price of new concrete and virgin materials.  
Read about Høje-Taastrup's [experience here](#).
- **Mikkeli:** In Mikkeli two different business cases for the demonstration sites, (Pankalampi Health Centre and Tuukkala Hospital) have been analysed, specifically:
  1. [Stripping and organizing reuse of demolition items in a selective demolition](#)
  2. [Reuse of concrete aggregate in concrete production](#)
- **Roskilde:** The recycling of crushed concrete as gravel fill and aggregate in new construction (multi-storey parking house) has been executed, and risk management has been [analysed](#). The case has found that additional costs have been associated with the excavation of obstacles and the ramming of piles, which were inevitable, but almost **€ 53,000 excl. VAT** has been saved on demolition, loading and disposal of concrete residues, as well as delivery and installation of new gravel fill.  
Read about Roskilde's [experience here](#).

# CITYLOOPS

CityLoops is an EU-funded project focusing on construction and demolition waste (CDW), including soil, and bio-waste, where seven European cities are piloting solutions to be more circular.

Høje-Taastrup and Roskilde (Denmark), Mikkelí (Finland), Apeldoorn (the Netherlands), Bodø (Norway), Porto (Portugal) and Seville (Spain) are the seven cities implementing a series of demonstration actions on CDW and soil, and bio-waste, and developing and testing over 30 new tools and processes.

Alongside these, a sector-wide circularity assessment and an urban circularity assessment are to be carried out in each of the cities. The former, to optimise the demonstration activities, whereas the latter to enable cities to effectively integrate circularity into planning and decision making. Another two key aspects of CityLoops are stakeholder engagement and circular procurement.

CityLoops started in October 2019 and will run until September 2023.



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 821033.

**Disclaimer:** The sole responsibility for any error or omissions lies with the editor. The content does not necessarily reflect the opinion of the European Commission. The European Commission is also not responsible for any use that may be made of the information contained herein.