

Circular Procurement in 8 Steps

Guideline for the Civil and Hydraulic Engineering Industry



Circular procurement in 8 steps

CLICK TO GO TO THE STEP YOU WANT ►

There are always multiple disciplines involved in a procurement process. We have indicated for each step which discipline should at least be involved.



Internal client



Project manager



Procurement officer



Sustainability adviser



Contract manager

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Securing circularity

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Managing circular contracts

Challenging the market

We have to go all out to achieve our target of making the Netherlands 100% circular by 2050, according to the Circular Construction Economy Transition Team. This extends to the entire construction supply chain, from initial initiative and tendering phase to implementation and management. In the Implementation Programme, our focus is now on the demand side: circular commissioning practices.

As part of that, we are developing two Circular Procurement in 8 Steps guidelines. One for residential and non-residential construction and one for the civil and hydraulic engineering industry. The idea is to help clients and commissioning authorities incorporate circularity into construction projects. From formulating ambitions and getting everyone across the organisation to buy into them to putting out the right invitation to tender, organising the tendering process and the collaboration, ensuring circularity performance is guaranteed, and taking care of contract management.

Needless to say, the properties involved are always unique with their own location-specific opportunities. It always requires customisation. As a client or commissioning authority you can assess in advance where you can make the greatest circularity gains. On the one hand, the buyer's role is limited, as many of the design choices are made earlier on in the process. On the other hand, the buyer also has a key responsibility to incorporate circularity principles into the tendering procedure. Together, we represent major

procurement power, which we can harness to ensure a continuous stream of circular invitations to tender and to achieve some level of harmonisation on the demand side. This is how we challenge the market to - within several years - realise the targeted scale-up. Commissioning authorities in the public sector certainly have a task to fulfil as a launching customer.

This publication contains a diverse mix of fine real-life examples: civil and hydraulic engineering projects on land and on water, construction and maintenance, commissioned by local authorities, water boards, and provincial authorities. For each step, these cases will illustrate how circular procurement is already being put in practice.

The examples cover a broad array of ways in which organisations have gone down the road of circular procurement. Use them to your advantage! After all, there is no need to keep reinventing the wheel, it's okay to copy. There are plenty of possibilities, both in terms of what can be done and in terms of what is allowed. We need to come together as the construction supply chain to take important steps now and generate momentum in the demand for circular buildings. From the procurement domain, we can contribute significantly to a circular construction economy. Every step in the right direction is progress. So, take that step.

Elphi Nelissen

Chairman of the Circular Construction Economy Transition Team

'We have to go all out to be circular by 2050.'



From ambition to implementation

The Netherlands has high circular economy ambitions. We are working towards a ‘fully’ circular economy by 2050 and want to have reduced our primary material consumption by 50% by 2030. And in the Dutch Climate Agreement, we have agreed to reduce our carbon emissions by 95% by 2050, following a reduction target of 49% by 2030. These ambitions have great impact on how to handle the construction and maintenance of our infrastructure: every year, roughly 260 megatonnes of materials are used¹ and nearly 3 megatonnes of CO₂ is emitted into the atmosphere.²

This Guideline provides procurement professionals and project managers at public-sector organisations with a perspective for action to get started with circular procurement in the civil and hydraulic engineering domain. Many parties in this domain have already gained the first experiences with climate-neutral and circular procurement on projects for things such as motorway fly-overs, roads, dike reinforcements, bridges, and street furniture. This publication includes sixteen examples of different kinds of projects by a diverse range of clients.

Definition of circular construction

Due to the major material and climate impact, parties in the civil and hydraulic engineering domain should adopt two ambitions jointly, i.e. aim for both climate neutrality and circularity. This Guideline uses the definition of circular construction from the Circular Construction Economy Transitional Agenda,

which also highlights the correlation of both these ambitions:

‘Circular construction means to develop, use, and reuse buildings, areas, and infrastructure without unnecessarily depleting natural resources, polluting the living environment, and damaging ecosystems. Building in a way that is economically sound and contributes to the well-being of people and animals alike. Here and there, now and later.’³

The role of procurement

A civil and hydraulic engineering project involves many different disciplines. Generally, (outline) designs are

1] Economisch instituut van de Bouw (2012), Trends en ontwikkelingen in de wegenbouw tot 2017

2] CE Delft (2015), Meten is weten in de Nederlandse bouw

3] Circular Construction Economy Transition Agenda (2018)



INTRODUCTION

made during the preliminary stages, and these projects involve interests of different stakeholders in terms of both functionality and lead time, while there is often also political pressure to complete a project without errors and delays. While procurement's role in realising climate neutrality and circularity ambitions initially seems limited as a result, procurement does certainly play a role.

However, circular procurement is not a goal in its own right, but rather a means to contribute to a circular project, and with that to a circular economy. Procurement's role is to explore to what extent, within the scope of the procurement process, they can adopt circular principles. In this respect, we see 'procurement process' as more than just the formal tendering process.


To us, the procurement process runs from setting ambitions through to contract management. The more invitations to tender with a circularity aspect to them are submitted to the market, the more advisers, building contractors, and suppliers will start to embrace circular developments. Creating this kind of demand for circularity will accelerate the transition towards a circular construction economy.

Circular economy is more than technology


The transition towards a climate-neutral and circular economy is not only a technical challenge. While technical innovations will be needed for new designs and materials, this transition also calls for an overhaul of the procurement process, as well as

different forms of collaboration. Aside from that, different kinds of financial incentives will be needed to achieve longer service lives and value retention. These are correlated aspects, which will each require changes as we work towards a circular economy. We have captured this in the IPF model (see Figure 1).⁴

Correlation with the Sustainable Civil and Hydraulic Engineering Approach

Parties in the civil and hydraulic engineering domain already go by the so-called Sustainable Civil and Hydraulic Engineering Approach (Aanpak Duurzaam GWW ) , which specifies how to incorporate sustainability into each of the phases of a project. The step-by-step plan presented in this publication further fleshes out the 'Procurement Phase' section of the Sustainable Civil and Hydraulic Engineering Approach for local authorities and the procurement for the Implementation Phase from this same approach.

Reader's guide

This Guideline is an adaptation an earlier *Circular Procurement in 8 Steps*  publication that is tailored specifically to the civil and hydraulic engineering industry, i.e. which specifically outlines the action that can be taken in the civil and hydraulic engineering industry.

This deeper contextualisation is based on interviews with various experts and people with hands-on experience in the area of circular procurement in the

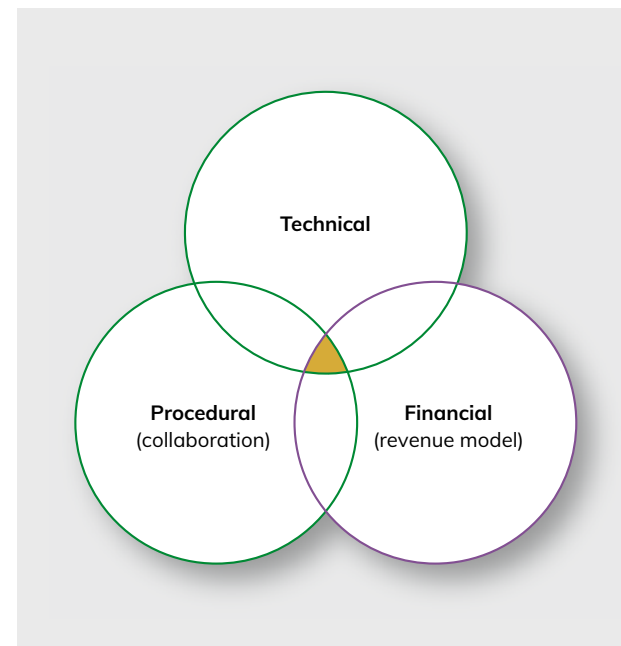


Figure 1 The transition to a circular economy requires changes in technical, process, and financial aspects.

civil and hydraulic engineering domain. Step by step, this Guideline will walk you through a circular procurement process, with one or two real-life cases presented with each step. The target group is also made explicit for each step, because procuring a circular project requires a joint effort from the (internal) client, the project manager, the policy adviser (sustainability), a financial expert, the buyer, and the contract manager.

4] Copper8 (2013)

Step 1. Circular procurement: why and what?

A circular procurement process starts with a clear ambition. How do you set such an ambition, and how do the various sustainability aspects relate to each other? In step 1, you will figure out what circularity means for the project and translate your organisation's policy ambitions to the procurement process. This is the starting point for the whole tendering process.

A definition of circular economy

At the current stage of the transition towards a circular economy, clear and unequivocal definitions of 'circular economy' and 'circularity' are still lacking.⁵ 'Climate neutrality' has not been defined clearly yet either, with various definitions in use today. It is, therefore, important to formulate both these things clearly early on in the process. Where possible, tie in with definitions that were used previously at your organisation or that other clients have used for projects similar to yours.

Circular mindset

When the idea is to minimise the climate impact of your project and to limit material consumption, preventing work altogether within a project is your best option - and sometimes also called 'the most circular' option. However, this is not always possible. A deci-

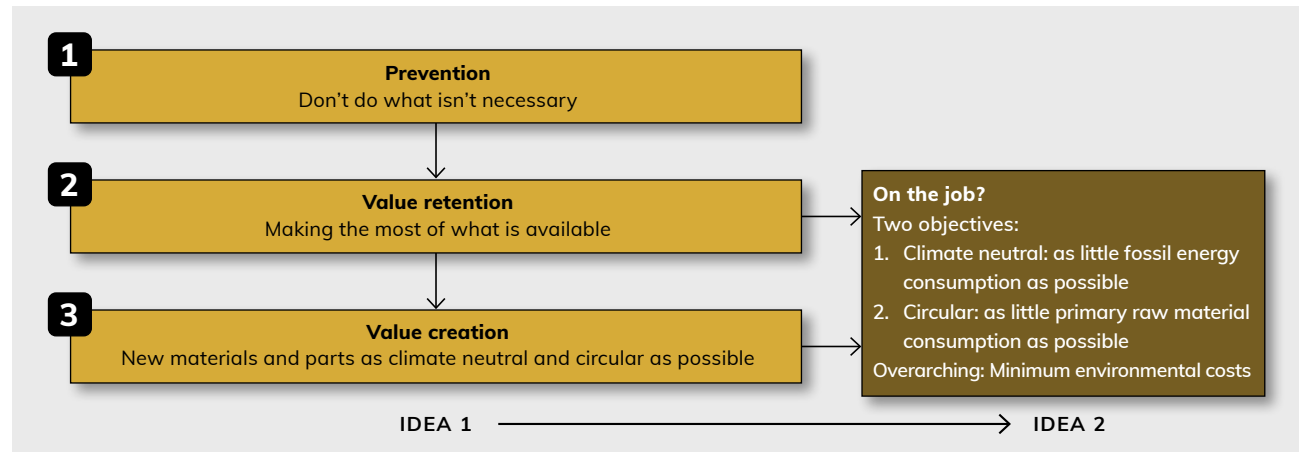


Figure 2 Two reasoning steps: the question whether something is necessary and how to make it happen in the most climate-neutral and circular way possible.

sion is often made at the start of a procurement process that something has to be built and you need to procure things and services for it. With this in mind, you should create scope for circular solutions within your project, solutions with less environmental impact and material consumption that still fulfil the original needs of the project.

When it comes to making choices, you face dilemmas. There is nowadays, for example, a 'rejuvenation cream' that extends the service life of asphalt, thus cutting material use. However, this cream also makes the top layer more difficult to recycle. Try to identify all the implications of the various options as best as possible, so that you always make well-considered choices.

Setting ambitions

Early on in the process, organise an ambition session to decide on the ambition to set for the project. The Sustainable Civil and Hydraulic Engineering Ambition Web (Ambitiweb Duurzaam GWW) can help you position climate neutrality and circularity among the other sustainability topics. As soon as you have set an ambition that targets circularity, you have to define a focus for it. When building a new stretch of infrastructure, for example, the focus will be different from when procuring for a maintenance project for existing infrastructure.

⁵ Kirrcher et al. (2016) Conceptualizing the Circular Economy: An Analysis of 114 Definitions

STEP 1. CIRCULAR PROCUREMENT: WHY AND WHAT?

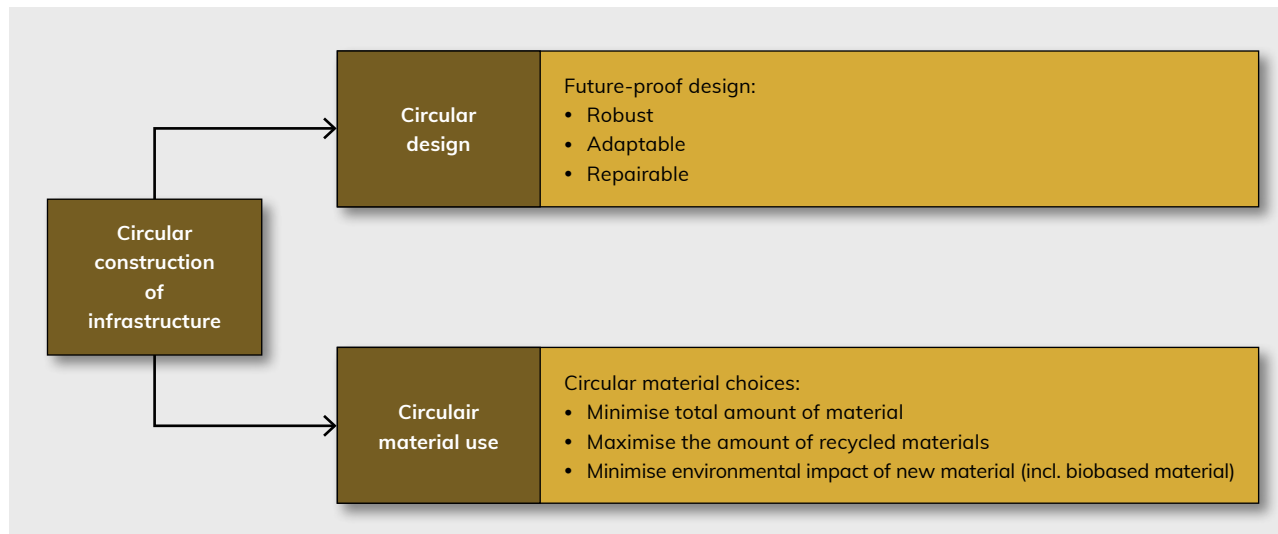


Figure 3 Circular constructions: circular design + circular material consumption.

When looking specifically at circularity for a project to build new infrastructure, there are two aspects that are particularly important: circular design and circular materials: see the explanation in Figure 3. Aside from that, you can, of course, focus on other sustainability aspects, such as the preservation or recovery of biodiversity.

Set the ambition and focus with the various project stakeholders, i.e. those parties that will play an important role during the actual work on the project. Besides the project manager for the implementation phase, this can also include the buyer, technical manager, contract manager, policy department, and perhaps even the finance department. Getting them involved will create a sense of ownership among all these stakeholders and forge understanding of the project. This will make it easier to maintain the ambition across all phases.

Tips

- Formulate a clear definition of circular economy for your process, as well as of other relevant concepts, such as circular material. This way, all parties involved will know what they are dealing with.
- Take your time to set ambitions, don't rush it. Explore project-specific opportunities and the responsibility you would have to take as a client to seize these opportunities (such as responsibility for the design) and what challenge you set the market.
- Place ownership of the ambition document with internal stakeholders as much as possible, so as to foster commitment to the ambition and create understanding of why it has been set.

Context: insufficient reused material available

The most-used materials in civil and hydraulic engineering projects are concrete, steel, and asphalt. In the Netherlands, availability of recycled concrete, steel, and asphalt is limited. In the civil and hydraulic engineering industry itself, only replacement projects produce materials that can be reused, while reusable materials are also needed for new-build projects. Using only reused material is, therefore, simply not an option. As an illustration: Of all the material that Rijkswaterstaat (Directorate-General for Public Works and Water Management) has used for its civil engineering structures (mainly concrete) over the past years, only 22% was reused material,

partly due to the above scarcity of reused materials.⁶ On top of that, we want to prevent materials for reuse having to be shipped over large distances, as the transport would cancel out the environmental gains of reusing materials. Therefore, avoid using strict requirements with respect to reused material when you cannot be sure that these can indeed be met. Always make a comprehensive appraisal based on the total environmental impact, which you can do using the environmental cost indicator (ECI).

⁶ Rijkswaterstaat (2020), Jaarrapportage Impulsprogramma Circulaire Economie 2019

Cruquiusbrug bridge renovation

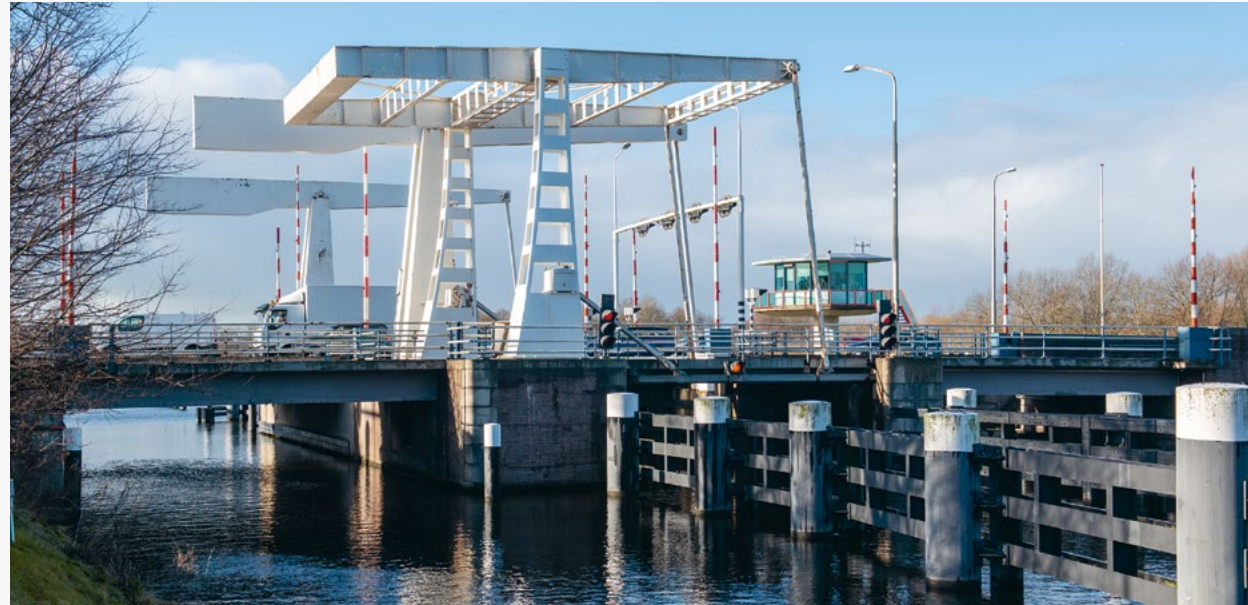
Noord-Holland provincial authority

The renovation of Cruquiusbrug, a bridge in the town of Heemstede, was an important project for the Noord-Holland provincial authority as a kind of pilot to figure out how to put sustainability ambitions into practice. Of the two bridge sections, one had to be replaced completely and the other needed major maintenance work. Early on in the project, several ambition sessions were convened, where the team agreed on the ambitions, definitions, and principles.

The ambitions for this project were, besides circularity, for the project to be an energy-neutral and low-maintenance project. With these ambitions, the provincial authority translated the various Green Deals, agreements, and conventions they had signed to project level.

The circularity ambition led to five principles:

- 1 High-quality reuse of recovered materials, whereby reuse within the project takes precedence over reuse of materials sourced elsewhere
- 2 Future reuse of parts takes precedence over reduction of material use, including the standardisation of measurements and connections based on the NTA 8086 standard for indus-



trial, flexible, and demountable construction of moveable bridges

- 3 Targeting the lowest possible ECI in the design and implementation to minimise the project's environmental impact
- 4 Material passport and demounting manual are required
- 5 There is scope to apply innovative technologies, whereby an innovation file must be submitted along with the tender to detail how this technology can be used

Realising the ambitions was designated as one of the key success factors for this project. Other key success factors were 'effective collaboration' and 'not altering the traffic situation'. During the tendering process, there was also ample opportunity to discuss and, if necessary, amend technical requirements that obstructed the realisation of the ambitions. After the tendering process, the design was worked out in greater detail by a construction team made up of people from the client side and the contractor that was ultimately selected.

Long-term noise reduction programme

ProRail

Over the period through to 2030, ProRail and Rijkswaterstaat (Directorate-General for Public Works and Water Management) will be working on a long-term noise reduction programme. As part of that programme, noise barriers will be placed along dozens of kilometres of motorway and railway. As early as in 2017, ProRail internally started to explore opportunities for sustainability. In a process that involved the commissioning party, managers, the project organisation, and the relevant local authorities, they identified opportunities.

After this process, they ultimately worked out 15 ideas in greater detail. The broad involvement of different parties generated great enthusiasm among all stakeholders to get started with sustainability. Everyone saw the value it could create for the project and for society. From 2019, ProRail and Rijkswaterstaat actively started to work together in the field of sustainability. In a joint process, they further refined the ambitions to be able to submit the clearest possible invitation to tender to the market. It revolved around circularity and climate neutrality. The ambition led to several choices:

- Existing transparent noise barriers along the high-speed railway line will be reused at other locations.



'Clear sustainability ambitions can increase the social value of this project. In order to be able to achieve significant sustainability gains in a project, programme, or portfolio, it is important to get all stakeholders, especially the commissioning party, involved in the process at the earliest stage possible, and to tap into their intrinsic motivation to get them excited about the project, programme, or portfolio.'

Robbert Vroomen, Sustainability Adviser (ProRail)

- 50% circular material use is targeted in the production of new noise barriers
- A low ECI value is targeted in the production and installation of new noise barriers. The ECI value cap was lowered over consecutive contracts, and the aim is to achieve a 10% reduction every year over the period from 2021 to 2024.

The sustainability ambitions were further tweaked in a series of talks with producers and building con-

tractors. In a plenary market consultation, ProRail and Rijkswaterstaat shared the outlines of their ambitions and answered the first questions from the market. In an online survey, the market parties provided more details of what they can do, and they went further in depth in a series of individual meetings to identify opportunities and barriers. The input from these meetings was the basis in further fleshing out both the technical documentation and the tender documents.

Step 2. Internal organisation and alignment

The basis for a good procurement process is to have a clear and unequivocal notion of what you are asking the market for. How do you garner internal support to create this unequivocal notion?

Step 2 is when you get the internal organisation on board. This includes looking at the impact that circular procurement may have on your organisation and seeking collaboration with the disciplines that will be needed for an optimal circular procurement process.

Starting point: create scope for quality

In the civil and hydraulic engineering industry, almost all of the clients are commissioning authorities from the public sector. This means that these clients are also responsible for the adequate functioning of the industry as a whole. Over the past few decades, public procurement processes in the civil and hydraulic engineering industry were focused largely on time and money. This focus has put considerable strain on the industry and caused there to be relatively little innovation by and collaboration within the industry.

Furthermore, it is important to realise that the social costs of the projects are not considered when procuring on price. But as a society, we do still have to bear these social costs caused by carbon and nitrogen emissions, among other things. In order to get market parties to help society realise sustainability ambitions and reduce social costs, they need greater scope for innovation. However, this requires a mindset change on the client side.

Consequences of circular procurement

A circular project also requires effort from across the client's internal organisation. Previous projects have shown that this is primarily about three aspects:

Leeway in specifications

Create scope to engage on technical specifications, so as to prevent them from inadvertently obstructing climate-neutral and circular solutions. Avoid, for example, heavy constructive specifications that are not necessary in all locations, or allow parties

to deviate from material specifications. These kinds of specifications are often included in existing sets of specifications that are applied to a project in full, such as handbooks for the design of the public space or RAW specifications.

Requiring the use of materials supplied by the client may also have a limiting effect, as it eliminates the option of using other materials with better circularity credentials.

Sufficient time

Take the time to set up a different design and implementation process, so as to properly incorporate climate neutrality and circularity principles. By contracting a party earlier on in the process, you can create more time to do just that. One example is the additional time needed to process or immediately reuse recovered materials, locally and in a high-quality manner.

Legitimacy versus fitness for purpose in the Dutch Public Procurement Act

Many procurement processes are managed primarily with the principle of legitimacy in mind. The Dutch Public Procurement Act, however, also sets fitness for purpose as a procurement goal: *The commissioning authority (...) sets out to maximise the societal value of the public assets when en-*

tering into a written agreement (...) (Section 1.4). This can be an argument to, in procurement procedures, also seek to realise climate neutrality and circularity ambitions, and to create scope to organise a dialogue to forge greater mutual understanding.

Knowledge level

Make sure the knowledge at the client side is at a certain level, both during the tendering process and in contract management. Assessing a quality-based action plan requires expertise on the matter at hand, and determining (and monitoring) of the ECI value requires knowledge of the organisation.

Different disciplines

If you want to apply climate neutrality and circularity ambitions to your procurement process, it is important that you get various internal stakeholders involved early. This at least means stakeholders from the following domains:

Internal clients

Get the internal client involved in time to integrate sustainability into the contract, if this has not yet been done to a sufficient degree. Do this while tying in with the organisational policy and any conventions that the organisation has signed on to, such as the CSR Manifest or the Green Deal for Sustainable Civil and Hydraulic Engineering (Duurzaam GWW), you will nearly always find things you can tie in with.

Management

During the early stage, take stock of the management organisation's needs. Liaise with them throughout the whole process. They will ultimately be the stakeholders who, after the work has been completed, will have to look after it. This will not only create understanding of the project, but also allow them to provide valuable insights that can benefit the project and perhaps help avoid unnecessary material consumption.



Technical engineers

Ask engineers, at an early stage, about ways to create leeway in the technical specifications to be able to meet the ambitions, and agree on an internal decision-making process during the procurement process or on the possible design or construction team that involves both the client and the contractor.

The importance of a good estimate

In the civil and hydraulic engineering industry, procurement is still often mainly done on price, despite the growing focus on quality aspects. Experience has shown that low-cost tenders are not always feasible when it comes to implementation, often lead to additional costs during implementation, and require the client to compromise on their ambitions. It is, therefore, key in internal organisation and alignment to get a clear idea of what a realistic price would

be for the work you want done. In this estimate, also leave scope for the realisation of ambitions. This will create a clear financial framework for the continuation of the procurement process, and internal stakeholders may even make their acceptance of the project conditional on there being such a framework.

Tips

- Identify the internal consequences of your ambitions, and discuss these with the relevant persons and departments at an early stage.
- Agree on a clear internal decision-making process with respect to things such as deviations from specifications due to the ambitions.
- Make a good estimate beforehand that can serve as a financial precondition for the project. This can help garner support.

Major maintenance on the N33 trunk road

Rijkswaterstaat (Directorate-General for Public Works and Water Management)

A 12-kilometre stretch of the N33 trunk road between the city of Groningen and the town of Appingedam in the far north of the Netherlands needed widening to improve accessibility and road safety. The northern part of the stretch was to be an entirely new road. The project was a joint project by Rijkswaterstaat and the Groningen provincial authority. Rijkswaterstaat and the Groningen provincial authority set high sustainability ambitions for the project, which is spread over four areas: climate neutrality, circularity, biodiversity, and social relevance.

An exploration of the possibilities showed that materials recovered when removing the old stretch of road could be used to widen the new stretch, cutting both the amount of construction material used and the logistical manoeuvring. To make this happen, a whole year needed to be added to the project.

Both the provincial authority and Rijkswaterstaat signed off on this in order for the ambitions to be realised. The circularity ambition also had the parties involved explore options to reuse old concrete blocks from the port of Eemshaven.

Given that sustainability extends beyond mere engineering or surroundings, a Sustainability Advocate was added to the IPM team (Integrated Project Management team) as the sixth member. This team member was tasked with further working out the 26 sustainability opportunities that had been identified, assessing which initiatives could be combined - such as the compulsory forest carbon offsets and local residents' wish of having a food forest in their local area - and seeking additional financing for sustainability measures. This member was responsible for getting all stakeholders on the client side on board.



Square, bridge, cycle path redevelopment

Haaren local authority

The Haaren local authority wanted to realise its socially responsible procurement ambitions. A circular economy is one of these ambitions. Every month, project managers and other stakeholders from across the organisation met up to explore opportunities for collaboration. Sustainability was always a fixture on the agenda for these meetings. In just over a year's time, these meetings produced three projects that involved circularity ambitions, which were all completed.

The first procurement procedure featuring circularity and carbon reduction as the ambitions was the redevelopment of one of the town's central squares, Monseigneur Bekkersplein. The local authority's aim was to make the square greener, cosier, opener, and more village-like. In the invitation to tender for the redevelopment contract, market parties from the green and civil engineering domain were asked to submit a plan that included both circular material use and reduction of carbon emissions. And it was a success: there was circularity in the use of materials for the square redevelopment, including concrete

slabs made of elephant grass, and added greenery. The monthly meetings stirred up a lot of enthusiasm. Other projects also wanted to get started with these ambitions. Market parties' positive response to the ambitions created a sense of confidence that these ambitions would also be welcomed in future tendering processes. The enthusiasm subsequently led to the climate neutrality and circularity principles also being included in the construction of a new bridge and the replacement of a cycle path. In these projects, the local authority looked both at circular material use (insight into the composition, origin, reusability, and toxicity of the materials) and at the carbon emissions of the project. This translated to, among the things, the use of electric equipment instead of diesel-powered machines.

In order to give more stakeholders across the municipal organisation an idea of what circular economy entails, the local authority organised a presentation for all employees. It also ended up inspiring them to incorporate circular economy into their own activities.



'I'm hugely proud that we managed to pull this off as a small municipality, and that we are a launching customer. By sharing what we are doing, showing what is possible. One of the parties that tendered for our first project but did not win the contract, for example, still embraced circularity and was involved in the follow-up projects, such as the cycle paths. This way, we are managing as a small client to get local parties to join the circularity movement.'

Martien Vromans, Alderman (Haaren local authority)

Step 3. Formulating your question

The invitation to tender details the core of what you need from the market. The question is, however, how to formulate this need - and with that the invitation - in the best possible way? In step 3, you will further delve into what you actually need and how to get this need filled, so as to create clarity both for yourself and for your potential contractors.

Functionality-oriented invitations to tender help you get to the bottom of what you actually need, without this necessarily being linked to a specific solution. One example in the civil and hydraulic engineering domain is to ask for a connection between the two banks of a river instead of specifically asking for bridge. By taking functionality (such as a river crossing) as the starting point, you create scope for tenderers to consider different solutions that can meet this need (such as a bridge, ford, tunnel etc.).

This way, the invitation to tender can steer the thinking towards circular principles, including the prevention of material consumption. In the context of circular construction, experience has taught that you should make specifications as functionality-based as possible, but that you sometimes cannot get out of including

specifications in technical terms. The basic idea is then to use technical specifications where necessary, and functionality-based specifications where possible.

Level of detail

Especially with civil engineering projects, you, as the client, often make several choices beforehand, such as to replace a bridge or to build a new bicycle tunnel. Be clear on these kinds of things that have been decided in the preliminary process (such as the design), and then make your specifications as functionality-oriented as possible. The more of the design has been worked out by the client in advance, the less leeway market parties will have to come up with innovative solutions. At the same, you, as the client, can also include circularity aspects in your design (such as the decision not to move a fly-over).

Give market parties sufficient scope to be able to realise the ambitions you set. You should preferably give them some design freedom - or at least allow them to optimise the design - and where possible freedom to choose the material as they see fit. You could also choose to make both the design and implementation part of a single combined contract, whereby you determine the price at a later stage. Rijkswaterstaat is experimenting with this combined option in a so-called 'two-phase approach', with the design made in the first phase and the price for implementation determined in the second phase. This means that a party is contract-

ed for the implementation phase before there is a design, making it easier to incorporate optimisations.

Leeway in specifications

An invitation to tender often uses specifications that, inadvertently, ask for a certain (standard) solution. While this is understandable for things such as a bridge mechanism, given the maintenance needs, it is not always necessary to be that specific with respect to what materials to use (such as requiring a steel bridge railing). Aside from that, specifications are often taken literally from handbooks or guidelines for the design of the public space. Certain materials are often required in the specifications (such as type of paving slab) or even already procured by the client for the project (as free-issue supplies), curtailing opportunities for the use of more circular materials or materials with less environmental impact.

Tips

- Be clear on what choices you have already made as the client to realise your ambitions, and where you want to challenge market parties.
- Put the focus in your specifications on functionality as much as possible, and dare to give tenderers scope to suggest innovative solutions.
- Be clear on which (technical/ aesthetic) specifications apply, and where there is scope for possible adjustments. Agree on an internal decision-making process for these adjustments (see step 2).

Malderburchtstraat reconstruction

Nijmegen local authority

The Nijmegen local authority wanted to explore the possibilities for a circularity ambition for a 'regular' road reconstruction project, a project that was basically 'too small' and 'too standard' for a serious sustainability ambition. The aim was to make Nijmegen's most sustainable street.

The core of the invitation to tender was made up of a Schedule of Ambitions. Circularity was one of the five themes, alongside low environmental impact and high social cohesion. The local authority deliberately did not quantify the ambitions, so as to be able to determine what is possible together with the parties. The sustainability performance achieved (carbon reduction and circularity) turned out to far exceed the city's target. And the fact that a soil clean-up was prevented brought considerable financial savings, while various innovations were used.

The invitation to tender for this reconstruction was focused on the process, while the emphasis is normally on the project. It involved a combination of design (by a construction team of client and contractor) and implementation, for a fixed total budget of €1.4 million. The handbook for the design of the public space was used as an assessment framework, and not as the basic principle for the design.



It created ample scope to deviate, which led to the lowering of existing street lights to make them better fit the situation, the reuse of recovered paving material, and the prevention of tree relocations.

Where the estimate of the project costs was made based on regular project implementation, the Nijmegen local authority was able to deliver much

more quality with this project, at lower cost. Charging stations were installed, for example, which was not initially part of the plan. This approach led to a project ECI of around 52% lower than the regular scenario, while 76% of the materials used were reused materials. As a result, the sustainability results far exceeded the ambitions from the policy, without additional outlay.

Croeselaan redevelopment

Utrecht local authority

In 2015, the Utrecht local authority decided to redevelop a busy artery in the heart of the city behind its central station, Croeselaan. The council set the ambition to make it Utrecht's most sustainable street. Normally, the design for a new road is worked out to the very last detail beforehand, and subsequently submitted to the market in the form of specifications.

Given the steep ambition, a decision was made to give market parties scope to come up with their own ideas. Only a preliminary design was provided. The invitation to tender challenged parties to

provide quality on the five ambitions, including circularity and ECI, on a fixed budget.

The Utrecht local authority was surprised by the low environmental impact of the winning tender, which was even lower than the target they had set. Efforts in the area of circularity included the re-use of recovered materials. An approach based on service life costs turned out to be tricky for market parties. Seeing as they were not used to also handling the maintenance of a road they built, this was harder to slot into their operations.

In order to be able to fulfil the high ambitions, the project team engaged with the road manager

early on in the process. The road managers liked the idea of being invited to provide input for the formulation of the invitation to tender based on ambitions, and they also took part in the tender assessment process.

Tenders were run by them to make sure that the products and materials met the city's minimum management requirements. This made sure that the relatively functionality-oriented invitation, which was based on a preliminary design, met Utrecht local authority's quality standards from their regular technical specifications.



Step 4. Collaboration

A circular economy is not something you can create on your own: collaboration is key to a successful circular project, both between client and contractor and between partners from across the supply chain. What does that mean for collaboration with the market, including prior to a tendering process? In step 4, you will team up with the market to explore what is already possible, so as to define a good starting point for your procurement challenge.



A construction project often involves conflicting interests. The client will often want to complete an ambitious project at a low price, while contractors often have to dial down (circular) ambitions to realise a project in cost-neutral way. These interests are not easy to align. By making shared interests an explicit talking point during the procurement process - and before that - and maintaining a dialogue about any individual interests that arise, you will create greater mutual understanding and a joint starting point.

And these same dynamics often also develop between the various disciplines in the construction sup-

ply chain. Partly due to the pressure to keep costs down, the parties involved have to split the proverbial 'pie' between them, which often leads to ambitions getting diluted. Actively turning these dynamics around can actually lead to a shared vision, which produces innovative ideas that can help realise the circularity ambition while staying on budget.

Different areas of expertise

The different parties involved in a project all have their own specific expertise. Maintenance providers know the location and what the users look for in a road; engineering firms have expertise on the techni-

cal possibilities and complexities; contractors know everything there is to know about how to build; and suppliers have expertise on material innovations.

Get the various parties involved in your project based on their expertise. Try to harness all this expertise - precisely that of external parties - at the earliest stage in the process as possible, so that you can make the best possible choices. The extra time you will need for that during the preliminary process will often be amply recovered when you ultimately end up with a better end product or through a more effective implementation phase.

STEP 4. COLLABORATION

Collaboration between the client and the market

Historically, collaboration between the client and market parties has generally been organised along hierarchical lines, based on control. In order to be able to use everyone's expertise in a good way, we have to move towards a more equal relationship based on trust. This will create scope to engage on innovative solutions to be able to realise the ambitions. This starts before the tendering process with an open and proactive attitude on the contracting side.

Therefore, get market parties involved prior to issuing the invitation to tender, such as by validating the ambitions in a market consultation. For such a market consultation, you could go for a combination of a plenary and an individual setting: plenary to share and validate the ambitions and individual to gauge the possibilities at the various parties. Make sure plenary market consultations are captured in reports and share all the available information when publishing the invitation to tender: this will prevent situations where certain parties have inside information and ensure a level playing field for the tendering parties.

Collaboration between the contractor and the supply chain

In practice, collaboration in the supply chain is still largely driven by price. What is needed to break out of this mindset is to seek more direct contact with parties in the supply chain. This is a way to share the ambition with suppliers and gain insight into how their innovations can help make them happen.

More and more market parties want to go circular

More and more market parties want to get started with sustainability in their projects, as they, too, sense the urgency. Initiatives for sustainable projects or products are emerging at market parties on an increasing scale, including Plastic Road at road builder KWS (road sections made of old plastic bottles) and the Circular Fly-Over designed by Van

Hattum & Blankevoort and Spanbeton (dismountable fly-over). The Circular Road, a programme as part of which Dura Vermeer experiments with the concept of infrastructure-as-a-service is also an example. These latter two initiatives sought collaboration with a client for further elaboration of the projects.

Market exploration before the invitation to tender

Reaching out to the market at an early stage can help you get a better idea of what is possible, both in terms of innovative design solutions and in terms of things such as materials with low environmental impact. Therefore, engage with the market at an early stage to validate your ambition and to find out what are important success factors for them for a good tendering process. There are different ways to engage with market parties:

- A (digital) request for information (RFI) to get specific information based on a set of predefined questions. This is good in particular as a way to gain insight into technical innovations.
- A (verbal) individual consultation to engage with individual market parties to gauge their view on your project. This is particularly suitable as a way to validate things on which tenderers can compete with each other, such as the level of certain ambitions.

- A (verbal) plenary market consultation to engage with multiple parties at the same time. This is mainly a good way to validate the outline of your ambitions. And a clear signal from market parties can contribute greatly to the justification of choices (such as to organise a dialogue as part of the tendering process) to the rest of the organisation.

Tips

- Get market parties sufficiently involved and do it in time, also before the start of the tendering process. This could be done by validating ambitions through a market consultation.
- Work together based on expertise, instead of based on formal responsibility. Make sure you have all the relevant supply chain parties at the table in time. The resulting equality creates scope to realise the ambitions.
- The collaboration revolves around the functional need and the ambition: this creates scope to find the best solutions.

The Circular Road

Overijssel provincial authority

In late 2019, the Overijssel provincial authority and Dura Vermeer signed a collaboration agreement for a circular road on an 'as-a-service' basis. For this pilot project, they selected a 10-kilometre stretch of the N739 trunk near the town of Hengelo.

As part of the pilot, Dura Vermeer became the economic owner of the road paving for a period of fifteen years, from 2020 to 2035. During this period, they will take care of all the required work on the road (replacement, management, and maintenance). The provincial authority will continue to be the legal owner of the road. This split between economic and legal ownership bestows responsi-

bilities with the right party. The provincial authority takes care of traffic flow and safety and Dura Vermeer ensures availability of the road and that the materials used retain their value.

After signing the collaboration agreement, the provincial authority, i.e. the client, and Dura Vermeer, i.e. the building contractor, had work sessions to jointly flesh out the schedule of requirements and the basic agreement (based on uniform administrative conditions for the execution of works (UAV)). This led to a set of KPIs for accessibility (traffic flow, availability), circularity (material consumption, percentage of secondary material used), and climate neutrality (ECI). They also de-

veloped a set of design principles to include climate neutrality and circularity in the design and implementation. The lessons learnt from the pilot project are shared in the two-year partner programme called 'The Circular Road', which sees three provinces and three municipalities run learning projects in partnership with Dura Vermeer and Delft University of Technology.

As a result of the early collaboration between the client and the contractor, all organisational and technical choices were made by the client and the contractor jointly. And all the stakeholders provided input from their specific areas of expertise to achieve the best possible end result.



Circular Fly-Over

Rijkswaterstaat (Directorate-General for Public Works and Water Management)

Van Hattum & Blankevoort (VHB) took the initiative to build the Circular Fly-Over, a modular fly-over that, after a first service life in one location, can be dismantled and rebuilt elsewhere. In their search for parties for their innovative ideas, they found Rijkswaterstaat as client and Spanbeton as concrete supplier.

After a no-obligations design process that produced an Outline Design, Rijkswaterstaat awarded the contract for the further design and the implementation privately to VHB and Spanbeton in a single contract, following which the fly-over was designed further and built. For six months, the fly-over was located at a test location near the town

of Kampen, where its performance was measured through intensive monitoring. After this six-month period, the fly-over was dismantled and put into storage, awaiting a new location.

Developing such an innovative product, which is built to last 200 years and can be built and dismantled multiple times, involved several new engineering issues. In the dynamic collaboration, each issue was tackled by the party that had the most expertise in that particular area, instead of the party that was formally responsible for it. This equal collaboration between all the parties was a key success factor for the project.

To make this project a success, all the parties across the supply chain needed each other. The fly-over could not be built without the initiative by Van Hattum & Blankevoort as the building contractor, could not be designed without the expertise of Spanbeton, and could not be put into use somewhere without Rijkswaterstaat commissioning it.

When faced with setbacks and technical challenges, the parties did not fall back on previously made agreements, but sought to find workable solutions to be able to realise the end product. As a result, all the stakeholders stayed energised and engaged throughout the whole process, which was at least just as important for the team.

'This kind of circular innovation requires knowledge and information from across the entire supply chain. This means that you need open and equal collaboration where people trust each other and work to a shared goal. That is the most important aspect of the whole story.'

Rob Valk, Assistant Project Manager
(Rijkswaterstaat)



Step 5. Tendering procedure

A good tendering procedure will help you select a good partner. How do you decide on the best procedure for your procurement? In step 5, you will choose the tendering procedure and further shape the procurement process. This involves working towards better mutual understanding between the client and the candidates, factoring in both the procedure's legitimacy and fitness for purpose.

Working towards better mutual understanding

The tendering procedure marks the transition from preparatory phase by the client to implementation by market parties. This transition is conditional on mutual understanding. This works in two directions: Candidates need to get a better understanding of the client's real requirements, and it will help the client to gain better understanding of candidates' innovation capacity in being able to realise the ambitions. Creating such mutual understanding is difficult when a procedure takes place on paper only. Engaging in dialogue during the tendering process will then be of great help.

Forms of dialogue

When it comes to shaping effective collaboration, it is important to also be in contact with each other away from the paper-based procedures. There are a number of different ways of doing this, including engaging in dialogue. As part of a tendering process, you can organise both plenary and individual dialogue sessions. A plenary session is an opportunity to explain the job at hand and the ambitions, take questions about it, and agree on how to organise the process. In individual dialogue sessions, candidates can explore their possible approaches for a solution. With a small contract, for example, a verbal information session may be sufficient, which also includes explanation of the job at hand and the ambitions. A dialogue phase will clear up things for candidates by creating understanding of the why behind certain choices. This often leads to fewer questions in requests for additional information, making the tendering process run a lot more smoothly.

On top of that, the Dutch Public Procurement Act says that procedures have to be in proportion to the contract that is put out to tender. Too much dialogue and an overly long procedure lead to excessive transaction costs, which may force some market parties to drop out of the race. Therefore, make sure the dialogue is proportional to the contract for which you are inviting tenders. You can organise a 'light' version of a dialogue made up of only a few short sessions. If necessary, you can opt for a framework agreement for multiple

smaller contracts to make a more extensive tendering procedure proportional. You could also consider paying parties a fee to tender. Such a tendering fee will never cover all the costs incurred in tendering for the contract, but there is an important symbolic value to rewarding parties for their effort.

Good contractor practices require good commissioning practices

Collaboration is needed to realise circularity ambitions - see also step 4. Given that the tendering procedure is the first formal contact with the market, attitude is extra important. Based on the idea of 'action = reaction', an open, transparent, and proactive attitude on the client side will pave the way for good tenders submitted by market parties. Due to the worn patterns and market parties' dependency on public commissioning authorities, the client is the one who should take the first step in this respect.

Tips

- Consider organising one or several dialogue sessions. It will create better understanding of the contract among the candidates and give you a better idea of what innovation may be possible to realise your ambitions.
- Adopt an open, transparent, and proactive attitude during the tendering procedure. This way, you set the tone and encourage market parties to do the same.

Framework agreement for cycle paths

Port of Amsterdam

The Port of Amsterdam needed a series of new cycle paths to improve accessibility of the port area. Based on their sustainability-oriented organisational policy, several ambitions were formulated for the project, including circular material use and circular design.

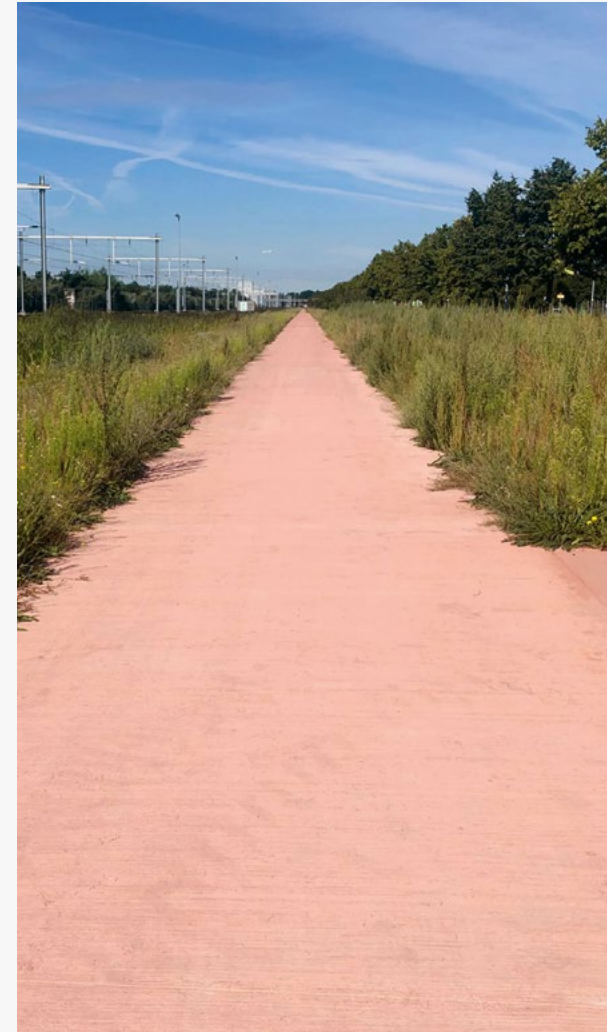
In order to create understanding of the ambitions among market parties and give the client an idea of the possibilities, a decision was made to organise a competition-oriented dialogue. This decision was prompted by feedback from the market during a market consultation where it was proposed to have a competition with negotiations. After a selection phase, the project was fleshed out further

The six ambitions formulated:

1. Circular material use
2. Circular design
3. Positive contribution to local biodiversity
4. Carbon-neutral implementation and maintenance process
5. Social safety
6. Social return

with three consortia during a dialogue phase. In a plenary session, the emphasis was on the process, and things that were in all parties' interest were discussed. In a round of individual dialogues, the emphasis was on the content, and things that were in the interest of each specific party were discussed. The commissioning authority was in charge of the plenary session, while the candidates were in the driving seat during the individual sessions. In an interview, the tendering parties further explained one of the award criteria - the changes required with respect to the specifications, including the risks and control measures.

The verbal contact between client and candidates generated better understanding of the ambitions and the contract, ultimately producing better tenders. The winning consortium was contracted to build the cycle path and manage and maintain it for a period of ten years. Under a framework contract, they were furthermore contracted to implement three further projects, provided that the performance promises for the previous projects were met. The concept designed for the project included an innovative demountable road surface that can, when work needs to be done in the subsoil, be removed and then put back.



Framework agreement for bridge renovations

Noorderzijlvest water board

The Noorderzijlvest water board faces the challenge of renovating and replacing approximately 17 bridges over the 2020-2023 period. The aim is to do this through a long-term collaboration with one party or a consortium. And the water board has also set sustainability ambitions in the area of circularity for the project. Given these ambitions, the procurement department has been involved in the process from an early stage.

In order to jointly make decisions on design choices and the circularity ambitions, the water board decided to use a construction team agreement. And to be able to continue to work with one party, a framework agreement was signed for all the bridges. Under that contract, one 'cluster' of bridges is tackled every year, for which designs are made and costs calculated. Design choices are made based on the environmental impact (calculated using DuboCalc) and the life cycle costs.

For the selection of the contractor, the water board ran a European, non-public tendering process. Following a selection phase based on previous experiences in reference projects, three parties were invited to tender. These tenders were assessed exclusively on quality: the parties designed an ap-



proach geared towards collaboration and circularity. The budget for information purposes (€16.6 million) was part of the guideline for tenderers, and the budget was not finalised until the construction team phase based on the actual work. In this non-public procedure, the water board consciously sought verbal contact with the market: briefly after publication, the invitation to tender and ambitions were explained further verbally. An interview with the three tenders was also part of the procedure.

This approach led to fine results for the first cluster (2020). For one of the bridges, for example, the land abutments could be preserved, meaning that only the bridge deck had to be renewed, almost halving the costs of this particular bridge renovation. The project furthermore used reused tubular piles as foundation piles, and bridge railings of the old bridge were refitted with a new coating. And the concrete from the old bridge decks was reused as run-on slabs - and wherever this proved impossible, the concrete was recycled to new concrete.

Step 6. Measuring and assessing circularity

To be able to award the contract to the best tenderer, you will need to determine the level of circularity you are looking for. How do you do that as objectively as possible? Selection and award criteria are set based on the specifications, insight into the disciplines, and the chosen tendering procedure. Setting these criteria includes deciding how to measure and assess the level of circularity.

Principles for the selection and award framework

Depending on the chosen tendering procedure (step 5), you have either both a selection and an award phase or just an award phase. In a selection phase, you can ask a candidate to submit their vision on climate-neutral and circular practices. To enable tenderers to set themselves apart, you can ask them for details of how they are already applying this vision in their operations. The award phase is all about the approach or the design for the project. For a good selection and award framework, use the following principles:

- Keep the number of criteria down, so as to create focus for tenderers

- Give quality sufficient importance, so as to prevent a low-cost provider without a good-quality plan from winning the contract. Check this using a sensitivity analysis.
- Designate clear assessment aspects, so as to make it clear on what basis a tender will be deemed to be good or not so good.

Selection phase: a preselection

If you have included a selection phase, you can also do a preselection of parties. Such a preselection will allow you to, for example, challenge parties on their vision on climate-neutral and circular practices. After the selection, only selected parties can then enter their tender during the award phase. Make sure that the number of parties you admit to the award phase is proportional: with fewer selected parties, the remaining parties have a greater chance of winning, and they may then be even more motivated to submit a good tender.

Award phase: measure or assess?

In a tendering process, you can both measure (quantitative) and assess (qualitative) the level of climate neutrality and circularity provided by tenders. Measuring can be done using the ECI or the percentage of reused material of a standard product (examples: square metres of asphalt, cubic metres of concrete). Assessing is possible with an approach of choosing the climate-neutral and circular options (examples: design choices, material choices for street furniture,

equipment choices). The combination of measuring and assessing often provides the most possibilities for the realisation of ambitions.

Measure: ECI or your own measuring tool

In the civil and hydraulic engineering domain, the Environmental Cost Indicator (ECI) is the most commonly used measuring tool. Use this indicator when it is clear what needs to be built. The ECI measures environmental costs, allowing you to take an effective approach to reducing the environmental impact of materials and activities. For more details of the ECI, see the Procurement with the Environmental Cost Indicator Guideline (PIANOo) . Environmental costs can be measured using DuboCalc software .

While work is currently ongoing on further standardisation of measuring methods for circularity, a standard is still lacking. Platform CB'23 has, however, come up with a core measuring method for the measuring of circularity . This core measuring method deals mainly with the environmental impact of materials and quantities, origin, and scarcity of materials used. Aspects such as detachability, guaranteeing reusability, and residual value at the end of a material's service life are still under development.

When it comes to determining detachability, the Detachability Guideline (PIANOo) provides a good starting point. A standard has not yet been developed for the measuring of the amount of reused material. If

STEP 6. MEASURING AND ASSESSING CIRCULARITY

Selection criterion	Sub-criteria	Assessment aspects
Climate-neutral and circular working	Vision on a climate-neutral and circular economy	<ul style="list-style-type: none"> • Alignment with the Client's vision; • Role of own organisation in transition to a climate-neutral and circular economy; • Way in which vision is applied to a similar project in the civil and hydraulic engineering sector.
	Assurance in own business operations	<ul style="list-style-type: none"> • Alignment with own vision; • Results already achieved in own business operations; • Insight into steps that can still be taken.

Figure 4 Example: Climate-neutral and circular economy as a selection criterion

you want to include this in your measurement, make sure you look at the total picture to prevent environmental costs going up as a result of a desire to use reused material (which may involve additional transport).

Assess: ensure multiple subjectivity

Assessing is generally done based on a qualitative criterion, and is often hard to do objectively. It could come in the form an action plan for the future reuse of materials, a process description aimed at reusing materials recovered during the project for the implementation process, or the way in which supply chain partners should work together to ensure high sustainability performance. Market parties have pointed out, however, that what sets them apart is actually found in the plans they submit to back up their proposal. Aside from that, you can also objectify the somewhat subjective judgements of an assessment committee by

agreeing on a clear assessment process beforehand, whereby each individual assessor first rates a tender on a specific criterion and specifies a clear rationale behind this rating, which is then followed by a 'consensus' meeting where all the ratings and rationales are discussed.

What is important here is that the assessment committee agree on a score that all members can accept, instead of merely averaging the ratings of the members, because the latter would give more weight to individual preferences (subjectivity) in the ultimate assessment. This will deliver the most objective assessment possible based on 'multiple subjectivity'.

Price-quality ratio

Market parties are increasingly actively asking to be challenged in the area of sustainability. It is important, therefore, to create scope in the award framework to

allow them to set themselves apart on quality. Given that 'awarding on value' is commonplace in the civil and hydraulic engineering domain, i.e. applying a notional deduction in euros to reflect the quality offered, it is important to use a notional deduction that is high enough, so that sustainability (along with other quality aspects) can be a differentiating factor.

A sample calculation. Let's say that the cost estimate for a fictitious project is €5,000,000. Giving a maximum notional discount of 70% on this amount, i.e. a deduction of €3,500,000, seems like a lot. All parties are expected to get a notional deduction to a certain degree. Let's say that the worst tenderer gets a notion deduction of €1,000,000 and the best one gets €2,500,000. The greater the notional deduction applied to a tender, the lower the tender price and the more attractive the tender becomes in terms of the

price-quality ratio. The total differentiating capacity based on quality is then €1,500,000, making the tender price a relatively big factor (€5,000,000) in selecting the winning tender.

Another option is to set a minimum and a maximum amount based on an estimate. Such a price bandwidth will prevent overly expensive and overly cheap tenders. When the price is subsequently converted into a points score, you can determine a pure price-quality ratio as a percentage. This does, however, require a good price estimate prior to the start of the tendering process - see step 2 - but will also produce a more predictable tender sum. On top of that, opt to not only look at investment costs, but at the total cost of ownership over a certain (fixed) period.

Tips

- Make your ambition a prominent factor in the award framework, both in the possible selection and in the award.
- Make a conscious choice as to how to measure and/or assess circularity, which depends on how you phrased the invitation to tender you submitted to the market. If it is clear what will be built, the ECI can be a good criterion to use. If tenderers still have a lot of leeway in the design, asking for an action plan for the application of circular principles may be an option to consider.
- Give parties the opportunity to set themselves apart on quality and prevent an (inadvertently) excessive focus on price. Setting a minimum and maximum amount may help with that.

Focus points for specifications and criteria

Formulating suitable specifications and criteria for the selection and award process is a key part of actually awarding the contract to the best party. The table below lists a number of focus points to bear in mind when formulating specifications and criteria. Some of these focus points relate specifically to circular procurement, while others are of a more generic nature but especially important when assessing based strongly on quality.

Option	Focus points
Eligibility requirements	<ul style="list-style-type: none"> • Be careful when asking for 'circular' references or credentials, because there is as yet no unequivocal definition of 'circular'. When you do ask tenderers to submit details of a reference project, make sure you specify what you mean by 'circular'. • Convene a market consultation to validate whether your specifications are realistic and will not (inadvertently) lead to too many parties dropping out of the race because they cannot meet those specifications.
Selection criteria	<ul style="list-style-type: none"> • Do not ask tenderers to just state their vision on the circular economy, but have them also substantiate their vision by, for example, including a second selection criterion relating to how their vision is reflected in their operations. • Formulate clear assessment aspects based on which you can judge the quality of the tender, so that you can identify what sets tenders apart in the assessment.
Award specifications	<ul style="list-style-type: none"> • Organise a market consultation to validate whether your specifications leave sufficient room to manoeuvre for tenderers and do not (inadvertently) block a certain circular solution. • Check compliance with specifications, such as by setting an ECI cap or a percentage of reused material to use.
Award criteria	<ul style="list-style-type: none"> • Choose a limited number of award criteria that allow you to identify what sets tenders apart on the aspects that are important for the project. • Where possible, try to combine 'measuring' (quantitative) and 'assessing' (qualitative) the level of circularity. • Formulate clear assessment aspects based on which you can judge the quality of the tender, so that you can identify what sets tenders apart in the assessment.

Platform slabs and retaining wall

ProRail

Many platforms at railway stations across the Netherlands do not meet the latest requirements: the entry height is not right or the length or width is no longer suited to current usage. Over the 2020-2024 period, ProRail will, therefore, have to upgrade platforms at around 65 stations. For this undertaking, ProRail has entered into a framework agreement with four parties that each get part of the contract. ProRail has ambitions with respect to material use, which they captured in the Environmental Cost Indicator for this tendering process.

Given that most of the materials needed for these platforms are concrete products - slabs and retain-

ing walls - the invitation to tender asked tenderers to specify an ECI ambition. For the sake of continuous improvement during the project, parties had to specify an ECI ambition for both products for each calendar year. Beforehand, both a reference value (based on the market average) and a target value (based on the best available products) were set. The ECI ambitions of the winning parties were subsequently included in the agreement as specifications for each calendar year. The criteria were weighted as follows:

- ECI ambition (40%)
- CO₂ performance ladder (10%)
- Price (50%)

The tenderers submitted very different ECI performance targets. The four parties with the lowest ECI value won the contract: the considerable weighting of the ECI criterion was decisive.

As a result of this focus on the ECI in the award criteria, ProRail ceased to work with its current supplier, which submitted a tender that had little to no ambition to improve the ECI. And a new, innovative supplier entered the frame, one that previously produced mainly for other sectors. Without the focus on the ECI criterion, this party would not have been able to set itself apart amidst the tendering parties, and would consequently not have tendered for the contract.



Public space at Schiphol Trade Park

SADC

With the new Schiphol Trade Park, the Schiphol Area Development Corporation (SADC) has set out to build western Europe's most sustainable business park. This business park is intended to be home to both logistics hubs and offices for parties looking to establish operations at and around Amsterdam's Schiphol airport. Seeing as SADC has public shareholders, they were under an obligation to put construction of the public space out to contract.

To challenge market parties, SADC developed an award framework with ample scope for parties to set themselves apart on quality. This award framework included three assessment criteria:

- an ECI score (40%)
- an Action Plan for Circular Exposure (30%)
- a price, compared to a maximum amount and the lowest price quoted (30%)

The ECI score was assessed in a qualitative sense, with the tenderer with the lowest ECI getting the maximum points and the other tenders getting points based on how far off the lowest ECI they were. This encouraged the market to truly innovate, without the client setting a specific target value for the ECI. The Action Plan for Circular Exposure was also assessed qualitatively on a scale



of 1 to 5, whereby a team of experts awarded scores at a consensus meeting.

The quality-based invitation to tender ultimately led to KWS winning the contract. In the implementation phase, a large number of circular principles will be applied: of the 13,000 tonnes of asphalt approximately 12,000 tonnes will be reused by adding

an organic rejuvenation agent to old asphalt and reusing the asphalt. The kerbs and slabs will be partly made of approximately 125m³ of elephant grass grown on the site of STP. The new sewerage and drains will be largely made of recycled concrete. And the equipment used will run on around 150,000 litres of CO₂-saving diesel, emitting nearly 90% less CO₂ than regular diesel.

Step 7. Securing circularity

As soon as the tendering procedure has been concluded and the contract has been awarded, the contract is formalised in financial arrangements and an agreement. How do you guarantee circularity in a way that promised performance is actually delivered? In step 7, you will explore what is possible using things such as circular revenue models, circular contracting, and a material passport.

In their tender, the winning tenderer makes promises in the area of climate neutrality and circularity. These commitments are the basis for the implementation of the project. To make sure that the performance to which the winning tenderer has committed is actually delivered, it is key to guarantee that they do by issuing financial incentives and laying the commitments down in the agreement.

In guaranteeing compliance with the performance commitments, it is important to focus on the people making the agreements. During a tendering phase, there will often be a fixed team at the table, but this team often changes once a party has won the contract and the actual project starts. Try to prevent these kinds of team changes, both on your side as the client and on the side of the market parties. Whenever changes on



the team are required nonetheless, get the new people up to speed on the ambitions of the project as best as possible and get them involved in the collaborative dynamics that have grown between the parties. This will maximise the chance that the performance will actually be delivered and agreements will be met.

Circular revenue models

Circular revenue models are a way to ensure circularity ambitions are realised by issuing financial incentives. In the civil and hydraulic engineering sector, this includes incentives such as a maintenance contract after completion of the project, whereby a fee is paid for the maintenance of the structure. This is an incentive to produce a high-quality product with low maintenance needs. Other examples are to pay for

performance (such as the delivery of light) or agree on a buyback deal for street furniture (for things such as traffic signs or mile markers).

Another option is to include a bonus-penalty model for the performance. When certain performance targets on the ECI value or targets for the use of reused material have been included in the contract, a financial bonus/penalty can help effectively enforce these targets. When performance is not up to the promised level, this system would see the contractor having to pay a penalty, while exceeding the target will earn them a bonus.

A dilemma that parties face in many civil engineering projects are the more project-based implementation agreements and area-based maintenance contracts that mean that maintenance cannot be outsourced to

the contractor for the project. This makes it difficult to offer financial incentives for service life extension.

Circular contracting


In the civil and hydraulic engineering domain, projects are often put out to contract based on uniform administrative conditions for the execution of works (UAV) with implementation based on the principles of RAW, which stands for rationalisation and automation of civil and hydraulic engineering projects or the same conditions for integrated contracts that include both design and implementation (UAV-GC). In both cases, you can agree on climate-neutral and circular performance. With an agreement based on UAV, performance will mostly come in the form of optimising the material use and activities. An agreement based on UAV-GC offers many more possibilities, because the contractor also makes the design.

If the tender included an ECI value, the subsequent contract often includes a stipulation that this ECI value must be attained. There are, however, also more innovative options, such as a bonus for an even lower ECI (in CO₂ equivalents), for the use of circular materials (in %), or for a reduction in the amount of material used (in kilogrammes) compared to set reference values. Needless to say, it is then also important to include penalties for when the contractor fails to reach the promised performance level.

A framework agreement allows you to agree on how the performance must develop: one way is to step up the performance target for each subsequent project. If performance is not up to par, you could consider terminating the agreement. Allow sufficient scope in the agreement for the contractor to come up with alternative technical solutions during the contract term,

because innovation never stops. This starts with formulating your question in the most functionality-oriented manner possible - see step 3.

Material passport

Making it possible to extend the service life of materials and reuse them starts by creating insight into which materials were used. This is where a material passport comes in, as it can provide that insight. Platform CB'23 has developed a Passports for the Construction Industry Guideline  that includes a possible set of information requirements for a material passport. Please note: these details cannot always be provided in full, because construction companies themselves have to get much of this information from their partners in the supply chain. Do ask for the information, however, so as to get the data submission process going.

Tips

- Prevent changes on project teams as much as possible. If team members need to be substituted anyway, make sure you get new team members tuned into the ambition and collaborative dynamism that has arisen.
- Look for ways to give the contractor financial incentives to realise your climate neutrality and circularity ambitions. This will create an incentive to actually realise the ambitions.
- Look into how the circularity ambition can lead to a financial win-win situation for both the client and the contractor, such as through an extended service life thanks to the use of better quality materials. Do this based on total cost of ownership.



Lighting-as-a-Service

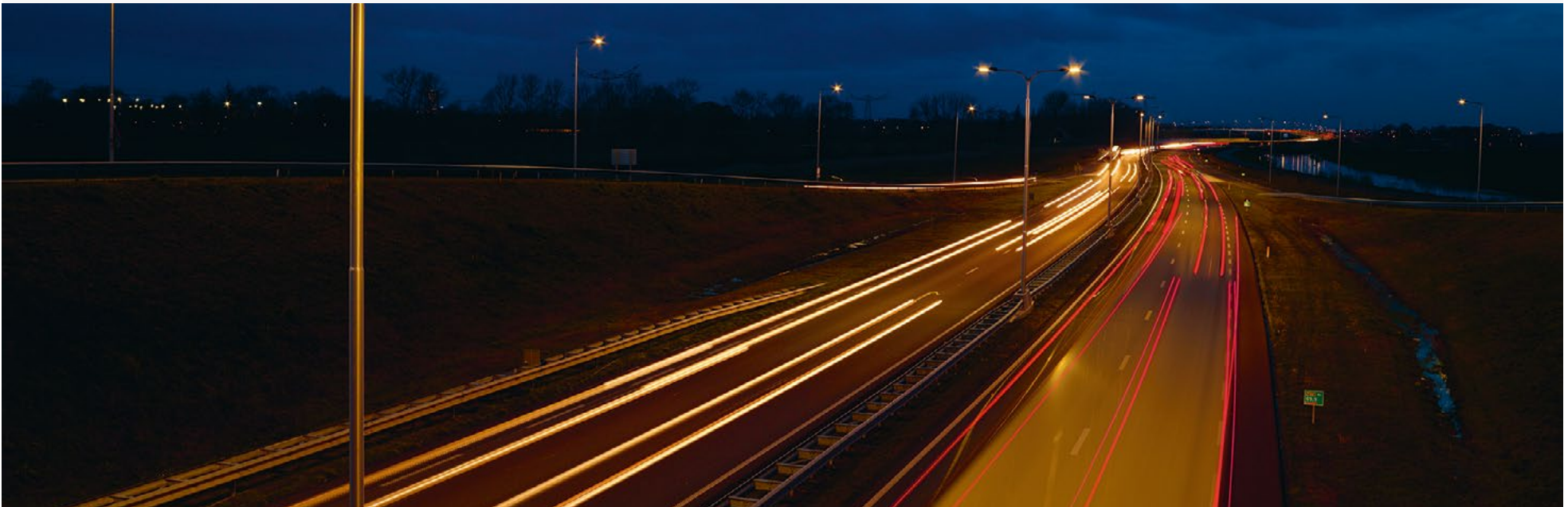
Noord-Brabant provincial authority

Along the northern part of the N279 trunk road between the towns of Den Bosch (A2 motorway) and Veghel (A50 motorway), the Noord-Brabant provincial authority and LUMI-US (Dura Vermeer/Hoeflake) are running a pilot with lighting-as-a-service. The street lighting has been made dimmable and can be regulated based on the weight of traffic and the weather.

This is done using real-time traffic and weather data, based on floating car data and data from the Royal Netherlands Meteorological Institute (KNMI).

It concerns a total of around 650 light fittings in 450 lighting columns, along a 17-kilometre stretch of road. It is supposed to produce 30-50% energy savings for the total stretch. And there will also be cost savings on account of the lamps' longer service life. The pilot is also intended to contribute to more circular use of the materials and to a more natural circadian rhythm for the nature in the surrounding area. In late 2019 and early 2020, adjustments were made to the lighting. Over a period of one year, the provincial authority and Dura Vermeer will be monitoring energy consumption and optimise the software for

automated dimming of the lights. During the pilot phase, LUMI-US receives a monthly fee for the availability of the lighting. The business case shows that the energy savings mean that the investment will be recouped over a period of fifteen years, whereby the environmental costs of electricity generation were also taken into account. This period is relatively long, which is partly due to the considerable costs involved in overhauling the existing lighting - which would be much lower with a regular implementation - and partly by the lower energy price paid by the provincial authority.



Road surfacing collaboration

Amsterdam local authority

For its road surfacing needs, the Amsterdam local authority has entered into a set of area-oriented framework agreements. The parties with whom these agreements were signed were selected purely on quality, whereby parties were asked to submit an action plan on how they intended to realise the sustainability ambitions.

In these sustainability ambitions, the focus is on cleaner equipment and fewer transport movements in the city. After the contract was awarded, the Amsterdam local authority and the market parties entered into joint consultation to agree on the standard fees payable for the work, including associated production standards. The basic idea was to ensure 'fair work at a fair price'. In practice, the fees ended up being 20%-30% higher than when selecting the tender that quoted the lowest price, but the 'regular' additional costs of 10%-20% per project are now a thing of the past. These slightly higher costs are worthwhile for the city because it prevents a lot of discussions about additional work - and with that internal process costs.

In the agreement, the lengthy specifications based on rationalisation and automation of civil engineering projects were reduced to 2-3 pages with principles for collaboration. An important nuance in



this respect was that the city was able to purchase the materials (oven-baked paving stones, paving slabs, kerbs) and provide them to the contractors as free-issue supplies. Climate neutrality and circularity aspects can be guaranteed even more in these supplies.

The collaboration agreement includes KPIs for the ambitions that have been set, including reduction

of the number of transport movements. These KPIs are monitored using a dashboard. In practice, developing this dashboard and getting the right details from all the parties proved a challenge: parties are not used yet to providing this information. And the internal organisation was not yet used to managing based on KPIs and production standards instead of based on budget. Further steps will have to be made in this area over the coming period.

Step 8. Managing circular contracts

After the contract has been signed, the next phase is when the actual agreed work will have to be done. How do you maintain the close collaboration from the previous phases? By including this step 8 in the procurement process, contract management becomes a central part of the realisation of ambitions.

Ambitions as a joint responsibility

Procurement is the start of a relationship. But it is not until the contract management phase during the performance of the contract that this relationship actually materialises. It is important, therefore, to still keep realisation of the ambitions top of mind during this phase. Given that contract management is generally handled by other persons (or even other departments), a good internal handover is very important.

The responsibilities are divided between the parties under a regular agreement. The ambitions, however, are a joint responsibility of both parties. It is up to the contractor to deliver on their promises from the tender, but it is also up to a client to create the right enabling conditions so that the contractor can meet those commitments - such as creating leeway in specifications, as also discussed in step 3.

Initial experiences with managing circular contracts

The first experiences with circular projects - and with managing circular contracts - show that it is possible to achieve a high level of sustainability performance. The results achieved in the cases presented in this guideline are fine illustrations of how an approach based on ambitions and close collaboration can lead to more circular solutions.

When it comes to ECIs, these are used mainly by larger governments in public procurement processes. They have the capacity to both set a good reference value beforehand and check these values afterwards. And in terms of circular material use, there are mainly opportunities in extending the service life of existing structures, as shown by the Nijkerkerbrug example with this step.

Working towards an equal and human relationship

Clients and commissioning authorities have traditionally always been the dominant parties in the civil and hydraulic engineering market. In order to work towards realisation of ambitions, we need a stronger focus on equality. This requires strong human relationships, on top of the largely legal relationship created as part of many contracts over the past years. This human aspect makes the collaboration more pleasant and 'the work is simply more

fun because of it,' as various project managers have confirmed.

For a contract with a circularity ambition, make sure you also select a contract manager with an open mind and relevant knowledge. In this same respect, you should also foster knowledge development, so that the project can also be managed based on circularity from the client side.

Record insights in standard documentation

To strengthen learning ability and truly work from pilot to scale-up, it is important to take stock of the main lessons learnt (briefly) after completion of the tendering and implementation process. You can do this with colleagues and the contracted party or parties, but perhaps also with the party or parties that was or were not awarded the contract. What is their take on the procurement and implementation process? Were any lessons learnt about the approach, or are there standard texts or documents that need changing? This is the time to do it, so as to embed valuable lessons from the circular pilot in the organisation.

Consider circular practices as an internal learning process

Circular practices (and circular procurement as part of it) are a learning process. In these early stages of the transition towards a circular economy, all the par-

STEP 8. MANAGING CIRCULAR CONTRACTS

ties involved are still trying to figure out how it affects their role, expertise, and involvement. This means that new insights may emerge, which may put past choices in a different light and mean that they, in hindsight, were not the best choices. Be honest and open about this, and share your lessons learnt: that's the only way to make progress together.

Tips

- Make the realisation of ambitions a joint responsibility of your organisation and market parties alike. Also from your role as the client, extra effort will be required from you, such as in creating leeway in the technical specifications.
- Maintain the focus on the ambitions during the contract management phase, so that they continue to be top of mind and are a running theme during implementation.
- Ensure sufficient capacity (manpower) to be able to monitor compliance with promises from the tender. The market parties also have internal dynamics, whereby monitoring of sustainability aspects will keep them on their toes in actually delivering on the performance promises.
- See circular procurement as an internal learning process, meaning that new insights may emerge. Be honest and open in sharing lessons learnt.



Nijkerkerbrug bridge renovation

Rijkswaterstaat (Directorate-General for Public Works and Water Management)

Rijkswaterstaat had to upgrade the bridge over the lock near Nijkerk, because the old bridge had reached the end of its service life. They put together a motivated project team that looked for a new approach to work together with the market based on equality and trust. Inspired by the statement of 'Don't talk about it, just do it!', the DOEN project was born.

The philosophy behind DOEN, which means 'to do' in Dutch, has two objectives: 'maximum customer value' and 'fair pay for fair work'. And these objectives are reached through 'optimum collaboration' and 'working based on the purpose'. 'Learning' is an overarching theme in this respect. All these five points are central to the process from internal preparation through to implementation. Maximum customer value was defined by the regional manager, supplemented with the wishes of local residents.

In the tendering process, the focus was already on mutual collaboration. The ultimate solution was not designed until the shared design process: service life extension of the existing bridge. Purely as a co-



incidence, this value retention of the existing bridge is a circular solution, while circularity was not a goal going into the process. Based on the objective of 'fair pay for fair work', both parties also set the price after the design had been completed.

After the contract was awarded, the good collaboration continued. The collaboration during the design and implementation phase was both pleas-

ant and personal. The basis of mutual trust and offering each other scope to use their expertise led to a process that was to all parties' satisfaction. When they faced problems, they thought primarily in terms of solutions, instead of who was formally responsible for it. The prominent place of the client in the whole process contributed greatly to this. The client ultimately paid a suitable price, and the contractor was able to make a nice profit.

'Maximum customer value and fair pay for fair work. You need optimised collaboration for that, and a drive to keep learning from yourself and from others.'
Koen van der Kroon, Project Manager (Rijkswaterstaat)

Bio-based bridge near Ritsumasyt

Friesland provincial authority

The replacement of a bridge for cyclists and pedestrians across Van Harinxma Canal near Ritsumasyt was the final part of a long-term civil engineering programme run by the Friesland provincial authority. The aim was to make it an iconic project. Given the provincial authority's circularity ambition, they decided to make it iconic in terms of the circular economy. The idea to develop and build a moveable bridge with a bio-based composite deck was born.

For the implementation of the project, the provincial authority put together a construction team made up of the province as the client, a producer of composite materials (DIC), a building contractor (Strukton), and a combination of engineering firms (Sweco and Wittenveen+Bos). They also sought collaboration with Greenpac (made up of the NHL Stenden and Windesheim universities of applied sciences), and knowledge institutions such as Delft University of Technology, Leuven University, and Osnabrück University were also involved. They did research into material properties, ran simulation tests to determine whether a bridge made of these materials would be fit for the intended use.

All parties represented on the construction team were driven and relished taking on the challenge



of the unknown. The priority, the dot on the horizon that they worked towards, was to deliver an iconic project. Needless to say, it was not all plain sailing. However, challenges are part of any innovative project. The shared focus on the end result helped parties overcome all these challenges. Seeing as the targeted end result had not been defined clearly beforehand, the price for implementation was set in mutual consulta-

tion by the construction team during the project. This unusual process ultimately produced a bridge made of resin and flax, a never-before-used combination. Both the bridge deck and the spans are made of biocomposites, and around 85% of the bridge is made of natural materials. On the back of the enthusiasm generated around this project, circular ambitions are now also increasingly set for other projects.

'Since we developed this by working together on a construction team, where everyone had the same ambition and worked towards the same goal, the process went much smoother than in a traditional client-contractor relationship. It has led to a bridge that is simply fantastic, in many ways.'

Sjoerd Vrieswijk,
Programme Manager (Friesland provincial authority)



In closing

This guideline shows that there are plenty of opportunities in the civil and hydraulic engineering domain to get started with circular procurement. The potential sustainability impact is huge. Market parties want to be challenged so that they can set themselves apart from their competition. The quality delivered in projects is rising. And, in the words of many of the people we interviewed for this publication, ‘the work is starting to be fun again.’

This guideline tries to specifically collect important insights in eight steps, so that anyone at a public commissioning authority can get started with circular procurement. From buyer at a local authority to project manager at the central government, and from sustainability coordinator at a provincial authority to internal client at a water board.








With these sixteen cases, we have sought to show what is already possible. Want to find out more about one of these cases? Feel free to contact the persons involved at the organisations in question, they will be happy to tell you more about their project!

And finally, we learn not only by acquiring knowledge, but also by gaining experience. This guideline is an invitation to get started with circular procurement in the projects you are working on. So that you experience for yourself what it can do for you, and how you can contribute to a circular economy and future-proof infrastructure.

Sybren Bosch & Cécile van Oppen

Further reading

The aim of this publication is to show buyers and other stakeholders in procurement processes how to apply ambitions for climate neutrality and circularity in a procurement process. We have built on a previous Circular Procurement in 8 Steps publication. Alongside this publication, we recommend the following further reading for more detailed insights:

- Inkopen met de Milieukostenindicator (PIANOo & Eco-Review) – a guideline for procurement based on the environmental cost indicator to give public organisations with less experience in this field perspective for action. 
- Handreiking Losmaakbaarheid (PIANOo & Alba Concepts) – a guideline on how to incorporate the concept of detachability into construction and infrastructure projects. 
- Verdiepende Handreiking Circulaire Economie voor MIRT-projecten (Rijkswaterstaat) – a guideline on how to apply circular principles in different phases of a project. 
- Inspiratieboek Circulair Ontwerpen (IPV Delft) – an inspiration for the circular design of engineering structures, with a wide range of examples of projects where circular principles were used. 
- Inspiratieboek Circulaire Economie Decentrale Overheden – an inspiration book with circular projects by local and regional governments. 
- Inspiratieboek Circulaire Economie Waterschappen – an inspiration book with circular projects by water boards. 
- Learning History Circulair Viaduct (Rijkswaterstaat) – the story behind the design and construction of the circular fly-over, with personal experiences of the various key players as an illustration. 



About this publication

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- Road-as-a-Service: Rosalie van Dijk (Dura Vermeer) and Erik Wiltink (Overijssel provincial authority)
- Demountable cycle path: William Bos (Port of Amsterdam)
- Bridge replacements: Kurt Meijer (Noorderzijlvest water board)
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- Lighting-as-a-Service: Bernard Smit (Dura Vermeer) and Ric Vergeer (Noord-Brabant provincial authority)
- Bio-based bridge near Ritsumasy: Sjoerd Vrieswijk (Friesland provincial authority)
- Framework contract for road surfacing work: Jorrit Kalt (Amsterdam local authority)
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