Dutch procurement approach for a more Sustainable Infrastructure

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Dutch Ministry of Infrastructure and Watermanagement

Program

• Introduction

• Interactive discussion: **Procurement strategy**

• **exercise:** case of buying a bridge

• The Dutch practice for GPP of infrastructure

• Examples

• Discussion
Rijkswaterstaat: three national infrastructure networks

Question 1: the basics

• Why do you need procurement?

• Why do YOU want Green/sustainable PP?
Why Green or Sustainable Procurement?

*Using the procurement process to stimulate our suppliers to deliver different products, use of more sustainable processes and to deliver extra value*

In short: more value for money!

1. We want the desired product
   but with extra quality aspect
2. Give a reward to innovative companies

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Green or Sustainable Procurement Strategy

1. what is your aim/goal?

2. how are you going to achieve that
   a. using procurement?
   b. Additional measures outside the field of procurement?
Exercise
discuss what your organisation can DO to create added value to society?

- Which sustainability goals are already important for your organisation?

- Which other goals are relevant for your organisation?
  - Is there a negative impact on one of the goals from your organisation?
  - Where could your organisation have an impact?
Maturity level of sustainable organisations: More holistic, value chain oriented, long term perspective

What can my organisation DO to create added value to society?

a) Changes within your organisation (e.g. facility management, machinery etc)

b) Changes with impact on (potential) suppliers (and their supply chain)

c) Work with partners in the total value chain (including users and their clients)

Concept of 1 linear value chain is too simplistic!

Discuss: what is sphere of influence for your organisation? Where is change necessary to reach (common) goals?

Can your procurement process stimulate change?
How to use procurement depends on type of purchase and your influence on suppliers.
Excercise/discuss what your organisation can DO to create added value to society?

- Choose a few types of purchases that your organisation regularly does.
- Discuss what the value chain is
- Discuss the sphere of influence of your organisation in the value chain

Sustainability goals Rijkswaterstaat

Focus:

1. Energy and Climate
2. Circular economy
3. Sustainable regional development
4. Sustainable transport
5. Sustainable water management
6. Health
Sustainability goals Rijkswaterstaat

"real"  
• 2020: -20% CO2  
• 2030 climate neutral infrastructure

"Circular Economy"  
• 2020: ECI value – 20% in RWS projects  
• 2030: RWS circular  
• 2030: -50% primary or raw materials  
• 2050: Zero waste

"Sustainable development"  
• Think from the area task  
• Multiple functions, more complex multi-disciplinary projects  
• Co-funded projects will be the standard

Types of CO2 emissions in the valuechain

- HFCs
- CO2
- CH4
- N2O
- SF6
- PFCs

SCOPE 1
- DIRECT
- Fuels for vehicles, etc.
- Industrial processes
- Power plants

SCOPE 2
- INDIRECT
- purchased electricity
- purchased steam

SCOPE 3
- INDIRECT
- products, services, etc.
- Transportation
- Construction

UPSTREAM ACTIVITIES  REPORTING COMPANY  DOWNSTREAM ACTIVITIES
Procurement strategy is important

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>sand harvesting</td>
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<tr>
<td>quarrying</td>
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<tr>
<td>coastal maintenance</td>
</tr>
<tr>
<td>concrete</td>
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<tr>
<td>river enlargement</td>
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<tr>
<td>soil</td>
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<tr>
<td>road bridges</td>
</tr>
<tr>
<td>sea-lanes maintenance</td>
</tr>
<tr>
<td>river maintenance dredging</td>
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1122 kton CO2/y
Innovation & Procurement: best friends or NOT

TWO parallel relations:

1. Buyer - Client relation (Procurement)
   - in general limited to proven technology
   - !!!! Innovation partnerships – within EU guidelines

2. Cooperative relation: development of innovation. From idea to proven technology

EU guidelines offer more possibilities: innovation partnerships

What happens when there is no Strategy?
Elements of an effective strategy

- Focus on the things that matter *(not as a hobby)*
  - Choose the right type of purchases

- Create scale for suppliers

- Consistency
  - Standardisation in contracting
  - Long term commitment

- Discuss strategy with valuechain

Competition -&gt; comparing tenders!!
Contract specifications, Selection criteria & Awarding criteria

Exercise: YOU are buying a bridge!
Interactive: buying a bridge – your thoughts

YOU want a new highway bridge:

safe for 80 years + low TCO + sustainable

Sustainable here means:
- sustainable construction and materials
- Low energy for opening and closing the bridge to let shipping pass

YOU are the buyer: What do you do?
(discuss with neighbour/group the basics of procurement in this case)

Comparing tender offers: who do you choose?

- SAFE and functioning for 80 years
- Total Cost of Ownership
- Sustainable
  - Construction/ Materials
  - Energy consumption
The sustainable Civil Infrastructure approach

Green Deal duurzaam GWW 2.0: Sustainability is standard procedure in the Dutch infrastructure sector projects (rail, road and water) for construction and maintenance.

Public-Private Collaboration: sustainability is ‘business’

Procurement: The theoretical procedure

1. Functional specifications
   - Ideal: no specific technical solutions demanded!!!

2. All decisions based on Lifecycle Costing and Total cost of Ownership.
   - Design, building and maintenance in one contract

3. Contract specifications
   - Standard in all projects (NEW for asphalt!!)
   - Project specific set of minimal contract specifications (e.g. energy use)

4. Besides prize, sustainability is an awarding criterion (OBJECTIVE comparison!)
   - Obligatory tools to be considered: CO2 ladder and DuBoCalc
   - Optional: focus on issues identified in the planning phase
Cooperation & Procurement: best friends

National voluntary programs on:
- Asfalt
- Concrete
- Building Logistics
- Etc etc.

Example for procuring (ASPHALT)RoadS

- Fixed specifications for many parts of the road construction
  - Road layout is political decision
  - Top layer is always very open asphalt
  - Uniformity over the width of the road is Rijkswaterstaat policy
  - Technology is accepted in tenders if quality can be proven

- What can be varied by the contractor in tender procedures?
  - the asphalt composition
  - The production process (temperature, sourcing materials, re-use %)
  - Layer thickness in some layers
  - Depending on type of contract we allow the contractor to take risk of innovations (D&C less allowed than in DBFM contracts)
Most Economically Advantageous Tender - MEAT

Rijkswaterstaat selects tenders on the basis of a combination of price and quality. Quality includes for instance:

- public oriented approach (‘less traffic hindrance’)
- sustainability
- project management
- design
- risk management
The end result: an example for DBFM contract

- The winner offered a bidding price of € 69,355,184.
- The winner offered to perform the work under the regime of the fifth rung of the CO2 Performance Ladder, so he earned a fictional deduction of 5% € 69,355,184 = € 3,467,579.
- The winner offered an ECC Value of € 2,700,000. This was even better than the minimum of € 2,800,000, which was hoped for. It assured him of the maximum fictional deduction of € 4,000,000.
- The bidding price corrected for the fictional deductions due to the CO2 Performance Ladder and DuboCalc was: € 69,355,184 - € 3,467,579 - € 4,000,000 = € 61,887,576.

Comparing offers/tenders with reference design

- MEAT discount
- CO2 ladder
- MEAT DuboCalc discount
- MEAT discount A
- Fictive price
Which asphalt is better?

A  Low temperature asphalt
B  50% recycling
C  15% less asphalt
D  10 km
E  Low temperature asphalt + 50% recycling

Monetising Environmental impact

1. Global warming
2. Ozone layer depletion
3. Human toxicity
4. Fresh water ecotoxicity
5. Marine ecotoxicity
6. Terrestrial ecotoxicity
7. Photochemical oxidation
8. Abiotic depletion
9. Depletion of fossil energy carriers
10. Eutrophication
11. Acidification

ECI = Environmental Cost Indicator

LOW = good
### NEN 15804 - Environmental Costs Indicator

<table>
<thead>
<tr>
<th>Environmental impact categories</th>
<th>Equivalent unit</th>
<th>Weighing factors [€ / kg equivalent]</th>
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<tbody>
<tr>
<td>Depletion of abiotic resources (excluding fossil fuels) – ADP</td>
<td>Sb eq</td>
<td>€ 0.16</td>
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<td>Global warming – GWP 100 j.</td>
<td>CO₂ eq</td>
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<td>Depletion ozone layer – ODP</td>
<td>CFK-11 eq</td>
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<td>Acidification – AP</td>
<td>SO₂ eq</td>
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<td>Eutrophication – EP</td>
<td>PO₄ eq</td>
<td>€ 9</td>
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<td>Human toxicity – HTP</td>
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<td>Fresh water aquatic eco toxicity – FAETP</td>
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<td>Marine aquatic eco toxicity - MAETP</td>
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<td>€ 0.0001</td>
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<tr>
<td>Terrestrial eco toxicity – TETP</td>
<td>1.4-DCB eq</td>
<td>€ 0.06</td>
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</tbody>
</table>

### Sustainability in construction:

Life Cycle Analysis NEN-EN15804

[Diagram of the Life Cycle Analysis NEN-EN15804]
Calculation in DuboCalc: the availability of data

Three data quality levels:

- Category 1: product-specific (brands), validated
- Category 2 data: branch average (no brands), validated
- Category 3 data: branch average (no brands), NOT validated. When used the values are increased with 30%

Comparing Designs: Environmental Cost Indicator (ECI)

Design
- Materials
- Energy use
- Energy production
- (Building) Process
- Logistics
In tenderphase not necessary to show design!
Analyses in DuboCalc

Output DuboCalc

Analyses type
Top 15 categorieën per fase
Cost
Bearing per
Milieu impact
Fiscale en sociale overwegingen (prognose)
Analyses in DuboCalc

What are the results?

Application of sustainable materials and reduction of used quantities are integrated in design & in tender proces.

Examples of resulting measures:

- Roadprojects with sustainable asphalt construction
- Projects with more sust. concrete (CEM III b/c in constructions, blocks for dykes)
- Re-use of road barriers
- Energy-efficient or even zero energy installations (locks)
- Sustainable transports: shorter and less volume of soil moved
- ...
Are quality incentives effective?

100% is ECI of reference design
triangel represents ECI value of awarded contract

English instruction movie on DuBocalc

https://www.youtube.com/watch?v=LJY9QzxlW2w&list=PL_55kP3K1IzD_tm0BaUj5sNxhBfytX6m&index=28
Using DuboCalc

1) As an awarding criterion. The bidder with the lowest ECI (the most sustainable design) is best valued.

2) As a minimum performance requirement (expressed in max ECI value) **NEW for asphalt**

3) As a process requirement: optimizing during the design process

4) 4) As a optimizing design tool and verification tool

No “design” options => do not use DuboCalc!!

Strategy for procurement of Asphalt roads
Carbon ladder certificate - the movie

The CO₂ Performance Ladder is...

- A carbon management system with 5 levels of certification

- A procurement system which allows the certificate to be used as proof of project delivery during execution of projects
  - Extra effort is rewarded: a higher score on the ladder means a higher advantage in the tendering process
  - Fully compatible with European regulations and the Public Procurement (Tendering Rules) Directive.
The CO$_2$ Performance Ladder is...

- An accredited standard: CO$_2$ management system (under ISO 17021)
  - Continuous Improvement (PDCA-cycle)
  - Associated with international standards and methods like ISO 14064, ISO 50001 and the GHG-Protocol
  - Consists of an audit checklist with requirements
  - Annually checked by 12 accredited Certifying Organisations (Lloyd’s, Dekra, TÜV, DNV GL)
  - One of the largest certifying systems in The Netherlands

The CO$_2$ PL for organisations

- Reduction in value chain + sector (scope 3; upstream, downstream)
- Reduction within company (scope 1 & 2)
Current state of affairs and results

- 900 certificates (thousands of companies)
  Over 60% is SME, many national and local governmental agencies are now certifying

- Over 100 (public) commissioning parties

- The Ladder transformed the "conservative" Dutch infrastructure sector

- Almost all major organisations working in infrastructure have:
  - Implemented a carbon management system
  - A carbon footprint
  - CO$_2$ reduction targets

- Supply chain collaboration

- CO$_2$ PL certificate >3 accepted as an alternative for legally obligated energy audit

- First results in CO$_2$ reduction are very promising
  (PHD research: 3.2%/year, μ=1.5%)

Guiding principles

- maximal focus on own initiative, practical results and innovation;
- minimal obstruction of the company by rules and regulations.

The ladder stimulates:

a) Knowledge about own CO$_2$ emissions and of supply chain
b) Continuously search for new options to reduce the emissions as a result of company processes and projects.
c) Use of green energy
d) to develop and apply new measures
e) Share that newfound knowledge in a transparent manner and be accountable
f) Use your sphere of influence to build coalitions to reduce the CO$_2$ output in the value chain even further.
THE LEGAL “TRICK”
Company certificate accepted as proof for performance in project

In tender procedure:
Levels of ambition with financial incentives given by the employer (level 1, 2, 3, 4, 5)

CO2 ladder Certificate is not obligatory

Company chooses ambition level for their bid on the project

If and when contract is signed they must prove performance of ambition in the project

Options:
- Use ladder certificate (within 1 year)
- Create proof for just the 1 project

Companies choose voluntarily to use COMPANY certificate as proof on a project.
CO2 ladder Certificate is more efficient as proof for more than one project.
Incentive on projects result in certification of the whole company!

In certification scheme are measures that can not be asked of companies in projects, companies know that those measures are part of the COMPANY certification and accept that.

Examples

- Small project
- Large project

Municipality of Apeldoorn for 9.3 km bicycle path construction

Apeldoorn - Cycle path

- Transport: 42%
- Materials: 53%
- Process: 2%
- Demolition: 2%

Standard vendor
- 20 t CO₂e emission in 3 years
- Transfer emission of 14 t Dutch "toll"ed fuels
- 120 t energy consumption

GIP 2020 vendor
- New procurement methodology leads to 46 t CO₂e reduction
- 39 t CO₂e emission
- 135 t energy consumption

Results
- Over the course of 3 years, reduction of:
  - 59 t CO₂e transfer emission of 14 t Dutch "toll"ed fuels
  - 275 t energy consumption

Hill-Blocks

Legal case!!

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Very large project in NL

Procura+ award
for 'Best tender procedure of 2016'
Project A6 Almere

- Smart transportation solutions
- Use of recycled materials
- Smart use of asphalt
- Energy neutral
Wishlist in general

- More sustainable materials and design
- Circular economy: re-use
- Electrification + using green power
- Sustainable fuels when electrification is not possible
- ...

Wish list for Asphalt (as an example)

- Decreasing lifecycle costs for roads & asphalt
- Decreasing ECI value for road construction including asphalt
  - >90% re-use for all layers
  - Low temperature
  - ..
- Practical way to include effect on traffic emissions in ECI calculations
- Continued cooperation with industry (in the Netherlands very well organised)
  - On Quality assurance
  - On developing and validating new technology (in RWS Innovation Test Centre)
  - Ambition and speed of change that is possible
  - Use of award criteria and the size of the incentives necessary to stimulate change
Conclusions

With this approach we achieve

- Lower environmental impact
- An optimized design
- Lower total cost of ownership
- An incentive to improve and innovate

Very cost effective & low risk
- for Rijkswaterstaat and our suppliers
Exercise in procurement using price and “quality” as awarding criteria (part 1)

Procurement of engineering staff using price/hour and “fysical fitness”

Discuss:
Will the use of extra quality aspect as an awarding criterium raise the costs?
Exercise part 2

You want to sell a service: Your costs are 80-100 keuro

Awarding criteria:
- Price
- Physical fitness of staff

- Contract awarded based on: PRICE – BONUS
  (= fictional price for comparison of tenders)
- Not delivering fitness is penalty: 2x BONUS
Exercise part 3

Discuss:

How would you improve this tender process?
Transition towards climate neutral infrastructure

From the work of:
Romée de Blois (MSc)
Dr. Gijsbert Korevaar (PhD, MSc)
Prof. dr. Kornelis Blok (PhD, MSc)
Delft, 30 mei 2018 (versie 1.1)
Sustainability & Life Cycle Analysis in constructions: NEN-EN15804

Asphalt

Concrete

Steel
This training has been organised by EIPA under the Framework Contract Nr 281962-16B/ENT/2016. The opinions expressed are those of the contractor only and do not represent the EC's official position.
Practical application of scenario’s

Analysis value-chain of a highway project
(A4 Leiden – Burgerveen)

Results of study: how to make the infrasector climate neutral