



Rijkswaterstaat
Ministry of Infrastructure and the
Environment



AGENTSCHAP
**WEGEN &
VERKEER**

Market consultation document

Dimmable LED Lighting Programme

Joint procurement by

- **Dutch Department of Public Works of the Ministry of Infrastructure and the Environment (Rijkswaterstaat)**
- **Danish Road Directorate of the Ministry of Transport and Building (Vejdirektoratet)**
- **Flemish Agency of Roads and Traffic of the Ministry of Transport and Public Works (Agentschap Wegen en Verkeer)**

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1. Introduction

1.1 Introduction

The Dimmable LED Lighting Programme is a joint procurement between the Dutch Department of Public Works of the Ministry of Infrastructure and the Environment (Rijkswaterstaat), the Danish Road Directorate of the Ministry of Transport and Building (Vejdirektoratet) and the Flemish Agency of Roads and Traffic of the Ministry of Transport and Public Works (Agentschap Wegen en Verkeer). The challenge of the Dimmable Led Lighting Programme is to replace lighting which has reached the end of life span along (parts of) the national roads and highways of the Netherlands, Denmark and Flanders by low life cycle cost dimmable LED lighting which offer, taking the entire life cycle costs into consideration, better value for money.

Dimmable LED lighting offers the advantage to dim the amount of lighting when less light is needed while the road safety remains the same. Ultimately this may lead to energy saving, extension of the life span of the lighting system, reduction of CO₂ emission, less light pollution and better light quality. This all may lead to a reduction of the life cycle costs of the lighting system.

The Dimmable LED Lighting Programme is currently in the plan preparation phase. During this phase the procurement strategy and the key technical aspects of the lighting requirements are being formulated. The Dutch, Danish and Flemish national road authorities wish to reflect on several aspects with market parties through two market consultations.

1.2 Objective of the market consultations

This document forms the basis of the market consultation. The objective of the market consultations is to gain further insights into the current market of national road and highway (LED) lighting and to discover what type of solutions are available. Furthermore, the market consultation is used to learn to what extent innovation is needed in order to reduce the life cycle costs and to discuss the opportunities and limitations within the project. Moreover, the objective is also to optimize the procurement strategy based on the information extracted from the market consultation.

Specifically, the road authorities wish to explore:

1. If there are existing low life cycle cost solutions available that meet or exceed the challenge;
2. If innovation is required to further reduce the life cycle costs of the solution;
3. If non technical solutions like pre financing/PPP, long term maintenance and other possible solutions can contribute to the reduction of life cycle costs.

1.3 Target audience of the market consultations

The target audience for the market consultations are players who are active in the road and highway lighting market, suppliers, manufacturers and contractors or consortia which consist of these market parties. The Programme also calls on contractors or consortia who are able to deliver the requested lighting through different contract forms.

1.4 Structure of this document

In section 2 we provide a description of the particularities and details of the Dimmable LED Lighting Programme, including the project scope and aim. Section 3 explains the market consultation procedure and the rules of engagement. Section 4 entails a questionnaire which you are requested to fill in and return to the national road authorities. Lastly, in annex 1 parties can find an overview of archetypes.

2. Particularities and details of the project

2.1 Project description and scope

A part of the lighting system of the Dutch, Danish and Flemish national road networks needs to be replaced because the end of the lifespan for these systems has been reached. This is a significant investment and the authorities lack financial resources to replace all the lighting at once. To increase the feasibility the three road authorities have chosen to cooperate in order to find dimmable lighting solutions which offer, taking the entire life cycle costs into consideration, better value for money. This means that not only are the initial purchase price and installation costs of importance, but factors such as, but not limited to, maintenance costs and energy consumption also need to be regarded. The road authorities are considering economization through the introduction of dimmable LED (lower energy consumption, longer life span and better light quality). This includes long-term maintenance or other creative contracting approaches, for instance the possibility of market parties not only supplying and installing the lighting but also providing service for long term maintenance and easier operation and installation. Furthermore, the road authorities are considering the possibility of (pre-) financing (light as a service) by the road authorities or the market.

In this first stage the Dutch, Danish and Flemish national road authorities have taken the initiative to take on the Dimmable LED Lighting Programme. A second stage may involve other national road authorities. The interest from other national road authorities in the European Union also depends on the knowledge we will gain from the planned second market consultation in September. The volume is influenced by factors such as, but not limited to, political funding plans (and decisions), the number of attending road authorities, and, of course, the received feed-back from the market actors joining the consultation in September. The volume is therefore not estimated at this step of the project.

2.2 Project objective

The project objective is to, through means of a joint procurement, replace end of life lighting and install dimmable (LED) lighting concepts with low life cycle costs along parts of the national roads in the Netherlands, Denmark and Flanders.

3. Market consultations

3.1 Market consultations

The first market consultation was held on June 28, 2016. The response from the market was very promising, with applicants varying from lighting parties (suppliers) to contractors. With the attendance of a significant representation of the market and the feedback which was given during this first consultation, the Dutch, Danish and Flemish national road authorities are convinced that market parties have an interest in the actual tender to submit a bid and are willing and able to offer low life cycle cost solutions for the challenge. Aims and objectives of the Dimmable LED Lighting Programme were presented by the road authorities. The second market consultation is scheduled to be held on September 14 and 16.

The objective of the second market consultation is to offer interested market parties the opportunity to propose their ideas and possible solutions and to check the interest of market parties for tenders regarding lighting replacement.

During the second market consultation the road authorities request interested parties to present their ideas and solutions for the low life cycle cost challenge to the road authorities in a face to face setting of 30 minutes (including 10 minutes Q&A). The information which will be presented by the market parties during these face to face presentation will be considered as confidential and will not be distributed to other market parties. In this presentation parties have to discuss the following points:

- Sheet 1: Concept solution to the challenge (based on the archetypes in annex 1)
- Sheet 2: Specific innovation (if needed for this solution)
- Sheet 3: Effect of solution on the life cycle cost (total cost of ownership)
- Sheet 4: Possible ways of financing and/or contracting the project
- Sheet 5: Possible ways of tendering
- Sheet 6: Other issues

Parties are also requested to deliver the following documents:

1. Lighting simulations for each archetype (annex 1)
 - a. Basis incl. maintenance factor relating to service interval
 - b. Results incl. yearly energy consumption per km
2. Total cost of ownership for archetype (annex 1)
 - a. Initial investment
 - b. Service interval and costs
3. Product documentation
 - a. Lifetime and reliability of driver and LED-module (in the luminaire)
 - b. Commissioning, serviceability and maintenance
 - c. Datasheet
4. Control- and monitor system
 - a. System overview
 - b. Control functions
 - c. Monitor functions
 - d. Communication standard
 - e. Access control and safety

Parties' presentations and the abovementioned requested documents may be sent to LED@RWS.nl, the latest by September 12, 2016. For the second market consultation the road authorities also request that you fill in the questionnaire in chapter 4. Please send filled in questionnaires to: LED@RWS.nl the latest by September 5, 2016 as shown in chapter 3.4.

The second market consultation is scheduled to be held on September 14, 2016, at Schiphol Airport, Amsterdam the Netherlands. Moreover, due to the large response from market parties, the road authorities have opted to organize a second meeting on September 16, 2016 in Copenhagen Denmark. The road authorities request all participating parties to confirm their attendance for the second round of market consultations in September 2016. Market parties may do so by e-mailing to LED@RWS.nl, the latest by August 25, 2016. In this e-mail parties are requested to state their preference for either September 14, 2016 in the Netherlands at Schiphol or September 16, 2016 in Denmark, Copenhagen. Moreover, parties may state their preference for either the morning or the afternoon. The national road authorities will do their utmost to facilitate these preferences.

However, the national road authorities cannot guarantee that parties will attain their preferred location and timeslot.

Based on the response, the road authorities will make a grouping in timeslots for the upcoming consultations. The timeslots and locations will be e-mailed to participants the latest by September 1, 2016 as shown in chapter 3.4.

At this stage it is explicitly not the intention to select a market party. No rights may be derived from this document and/or participation in this market consultation within the framework of the future tender.

3.2 Approach of market parties

The market parties have been informed about the market consultations via TenderNed and Ted. Market parties already known to the Dimmable LED Lighting Programme have been informed by means of a letter of announcement. Furthermore, letters of announcement have been sent to the national branch organizations of the Netherlands, Denmark and Belgium. All the market parties who have registered in response to this announcement will receive an invitation to the market consultation meeting on September 14, 2016 or September 16, 2016, and will also receive this document.

All updates on the Dimmable LED Lighting Programme and possible information notices will be posted on TenderNed.

3.4 Market consultation planning

| Date | Activity |
|--------------------|--|
| May 27, 2016 | Distribution of invitation |
| June 21, 2016 | Deadline for submission of interest |
| June 28, 2016 | First round market consultation |
| August 25, 2016 | Deadline confirming participation in second market consultation |
| September 1, 2016 | Grouping in timeslots and invitation with location |
| September 5, 2016 | Deadline submitting filled in market consultation questionnaires by e-mail Deadline submitting questions regarding the market consultations |
| September 12, 2016 | Deadline submitting presentations and requested documents by e-mail |
| September 14, 2016 | Second market consultation in the Netherlands, Schiphol |
| September 16, 2016 | Second market consultation in Copenhagen, Denmark |

3.5 Rules of engagement of the market consultations

The dimmable LED lighting Programme has set out the following conditions for the market consultations:

- The market consultations are not part of the procurement procedure that may follow.
- No rights can be derived from the information that is provided for the purposes of the market consultations.

- As a result of participating in this market consultation, participants will not be given any preferential status with respect to the procurement procedure, nor will participation lead to exclusion from such a procedure.
- The market consultation is a voluntary process and no rights can be derived from (insights resulting from) the market consultation.
- All of the information issued by the Dimmable LED Lighting Programme during the market consultation, and the list of participants, will be made public on TenderNed.
- The Dimmable LED Lighting Programme will develop a single report of the main points from market consultation meetings, with the exception of confidential business information which is presented by the market parties during the face to face presentations. This report will be made public on TenderNed.
- The primary language of the market consultation is English.
- All communication regarding the market consultation, and submission of the reply forms, must take place via the following email address: LED@RWS.nl.
- Market parties are requested to participate in the market consultation on a voluntary basis; they will not receive any payment for participation nor any reimbursement of expenses incurred as a result thereof.

3.6 Questions regarding the market consultations

Questions regarding the market consultations can be sent to: LED@RWS.nl the latest by September 5 2016. The questions will be stripped of all personal information and answered in a Notice of Information which will be published on TenderNed and e-mailed to participating parties which have confirmed their attendance for the second round of market consultations in September 2016.

3.7 Completion of the market consultations and evaluation

After both rounds of market consultations have been held, the Dimmable LED Lighting Programme will develop a single report of the main points from the market consultation meetings. This report will be made public on TenderNed.

4. Questionnaire

| |
|---|
| Theme: Interest |
| Q1 Would you be interested in submitting a bid once the road authorities submit a request for tenders in - indicative - Q2 2017? |
| A1 |
| Q2 Which factors influence your willingness to submit a bid? |
| A2 |
| Q3 Would you like to form a consortium? |
| A3 |
| Theme: Solution |
| Q1 Please provide a short description of the solution (sketch) you propose for the challenge of the Dimmable LED Lighting Programme? |
| A1 |
| Q2 How does the solution relate to: |
| A1 Better light performance (less glare, better color, less light pollution etc.) |
| A2 Reducing fixture costs (standardization, tuning drivers on ledengine, etc.) |
| A3 Reducing cost of steering dimming (No license, etc.) |
| A4 Reducing cost of installation (quicker installation, etc.) |
| A5 Reduction of maintenance costs (reduction cleaning window glass, easier targeting fixtures, less roadblocks, less use of platform truck, etc.) |
| A6 Reducing inspection cost (inspection of the tilt, control light output etc.) |

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|--|
| Theme: Interest |
| A7 Reducing administrative costs (energy consumption installation, etc.) |
| A8 Reducing energy costs (less kWh, less connection charges, less Cos pi charges) |
| |
| Q2 Describe – bullet wise- why your solution is beneficial for the Principal (not only low life cycle costs, but also other characteristics may be described here) |
| A2 |
| |
| Theme: Innovation |
| |
| Q1 With your solution as a basis, what kind of innovation do you need to further lower the total cost of ownership? |
| A1 |
| |
| Q3 If innovation is needed for your solution, what timeframe do you believe is needed for the solution to be market ready? |
| A3 |
| |
| Q4 If innovation is needed for your solution, what would the influence of the innovation be on the total cost of ownership? |
| A4 |
| |
| Theme: Financing/contracting |
| |
| Q1 Are you considering private financing? |
| A1 |
| |
| Q2 Which (private) financing solution are you considering? |
| A2 |
| |
| Q3 What is the influence of your financing solution on the total cost of ownership? |
| A3 |
| |
| Q3 Given the low life cycle cost concept how do you think this project can best be contracted with regard to the tender procedure and contract form in order to use your resources best? |
| A3 |
| |
| Theme: Other |
| |
| Q1 What are the risks or obstacles of this project? |
| A1 |
| |
| |
| Q2 How should we mitigate these risks or obstacles? |
| A2 |
| |
| Q3 Are there any particular issues you wish to draw attention to with regard to the Dimmable LED Lighting Programme? |
| A3 |

Annex 1 Archetypes

In order to benchmark performance of different comparable solutions we have worked out requirements for a total of 11 archetypes, grouped in 5 applications.

We invite you to demonstrate your proposal for one solution in each archetype.

Archetypes:

| Archetype | Description | Lighting class | Road geometry | Luminaire distance | Luminaire mounting height | Number of luminaries per pole | Pole layout |
|-----------|--------------------|----------------|---|---------------------------------------|---------------------------|-------------------------------|------------------------|
| 1a | 2x5 lanes motorway | M3 | hard shoulder: 2,5 m 5 x vehicle lane: 3,5 m median strip: 6 m 5 x vehicle lane: 3,5 m hard shoulder: 2,5 m | 90 m | 20 m | 2 | central reserve |
| 1b | | | | No requirements (free) | ≥ 16 m | | |
| 2a | 2x3 lanes motorway | M3 | hard shoulder: 2,5 m 3 x vehicle lane: 3,5 m median strip: 6 m 3 x vehicle lane: 3,5 m hard shoulder: 2,5 m | 90 m | 20 m | 2 | central reserve |
| 2b | | | | No requirements (free) | ≥ 16 m | | |
| 2c | | | | 74 m / x, x is an integer (wire-line) | 12 | n/a | |
| 3a | 2x2 lanes motorway | M3 | hard shoulder: 2,5 m 2 x vehicle lane: 3,5 m median strip: 6 m 2 x vehicle lane: 3,5 m hard shoulder: 2,5 m | 50 m | 12 m | 2 | central reserve |
| 3b | | | | No requirements (free) | No requirements (free) | | |
| 4a | 2x1 lane highway | M4 | hard shoulder: 1 m | 40 m | 8 m | 1 | 1 m from hard shoulder |

| | | | | | | | |
|----|-----------------|----|--|---------------------------|---------------------------|---|--|
| 4b | | | 2 x vehicle lane: 3,5 m hard shoulder: 1 m | No requirements (free) | No requirements (free) | | single (one side of road) |
| 5a | 2x1 lane street | M3 | sidewalk: 1,5 m bicycle path: 1,75 m 2 x vehicle lane: 3,5 m bicycle path: 1,75 m sidewalk: 1,5 m | 35 m | 8 m | 1 | 0,1 m from sidewalk double (two sides of street) |
| 5b | | | | No requirements (free) | No requirements (free) | | |

Control regime (applies to all archetypes):

- Switching on/off: sunset/sunrise
- Dimming: 30 % of nominal flux from 22:00 h to 24:00 h and from 04:00 h to 06:00 h, 10% of nominal flux from 00:00 h to 04:00 h.

Location (applies to all archetypes): Utrecht (52°N 5°E)

Delivery year (applies to all archetypes): 2018

Missing parameters to be assumed.

We ask you to calculate the following performance metrics for each archetype:

- Yearly energy consumption per length – average over lifetime (kWh/km)
- Price based on volume of 10.000 units

In addition our evaluation will focus on the following topics. Please, provide us with as much information you can on each topic. Comments and your ideas are also very welcome.

- Yearly energy consumption
- Price
- Total cost of ownership
- Usable lifetime of luminaire
- Useable lifetime of driver and light source (driver and LED-module reliability)

- Thermal management
- Open (non-propriety) communication standard (host layers in OSI reference model)
- Safety against unauthorized access ("hacking")
- Number of physical interfaces (preferably one whole product, no additional boxes)
- Easy installation and commissioning by low skilled personnel and prevention of installation errors
- Cleaning interval (relation to value of maintenance-factor)
- Control functions – turning on, off, dim (available remotely by traffic information center in case of incident and maintenance personnel at service)
- Monitoring functions – location, current state (on, off, dimmed), health and errors (current state have to be real-time, location, health and errors can be bulked once a day)
- Product documentation (installation guide, datasheet, CE-marking)
- Product test-reports (ingress protection, mechanical impact, wind load, vibration test, reliability etc.)
- Adaption to pole diameter (48, 60, 76, 108 mm)
- Serviceability (modular design)

