EU Premium Light Pro – support to public authorities and procurement guidelines

Thomas Bogner
Austrian Energy Agency
EECG, Vienna, 17th June 2019
Austrian Energy Agency  
A link between business, administration and politics

Founded as a **non-profit scientific association** in 1977

Today: 84 **employees**| EUR 8.5 million turnover

**Expertise and networking** for politics, administration and business

The **Presiding Committee** is made up of

- the Federal Minister entrusted with the management of environmental affairs as president;
- the Federal Minister entrusted with the management of energy affairs as Vice-President;
- a provincial governor to be nominated by the provincial governors conference as vice president.

- Members are the federal government, the federal states and more than 40 energy and social institutions
Our services in Europe
European Union and third countries

CA-RES: Coordination and management of the Concerted Action on the Renewable Energy Sources Directive on behalf of the European Commission

Consultation of the European Commission:

Advising potential EU accession countries regarding approximation to EU law (e.g. Serbia, Croatia)

Research projects under the EU program „Horizon 2020“

Energy Partnerships with Ukraine, Belarus, Bulgaria, Czech Republic, Slovakia and Romania

Networking with national energy agencies at European level (European Energy Network | E²R)
Premium Light Pro
Project consortium | key facts

Coordinator
- Austrian Energy Agency

Partner
- co2online GmbH – Germany
- Ecoserveis – Spain
- Energy piano – Denmark
- Energy Saving Trust – UK
- Fundacja na rzecz Efektywnego Wykorzystania Energii – Poland
- University of Coimbra, Institute of Systems and Robotics – Portugal
- Politechnico di Milano – Italy
- SEVEN – Czech Republic

Project Duration: 04/2016 – 07/2019 (40 months)

Funding: European Union (Horizon 2020)
Background

Target groups can use help with implementing lighting systems:

**Technology**
- bad experiences with retrofit
- hardly no long-time experience

**Economy**
- expensive & uncertain return of investment

**Capacity**
- deciders need higher competence
- deciders need support with procurement and evaluation of offers

**Goal**: Support the use of high quality and efficient LED systems
Premium Light Pro Tools & Services

Criteria, guidelines & information services
- Criteria for Green Procurement.
- Guidelines for design and implementation
- Product database.
- TCO tool

Training & international best-practice examples
- Modular training curricula for designers & planners, architects, installers, consultants, public administration
- Best practice examples from international projects

Policy level (EU & national)
- Support of policy development for LED lighting on EU level
- Improvement and implementation of policy instruments (EPBD, funding schemes, white certificates, performance contracting).

optimal LED systems in the service sector
Website www.premiumlightpro.eu
Guidelines
„LED street lighting“ & „Indoor Lighting“
Aim and content of procurement criteria

Basis for supporting procurement of LED streetlighting

Sections

A General elements and features concerning the specification of street lighting systems: Control features, metering etc.

B Selection criteria:
Criteria specifying general requirements for the selection of the tenderer

C Technical criteria:
Criteria concerning the quality, efficiency and safety of the lighting system, including both mandatory requirements and award criteria to be used with a scoring approach

D Contractual issues:
Requirements concerning the installation and calibration of the system
PremiumLight Pro
Technical criteria street lighting

- Power Density Indicator (PDI) and Annual Energy Consumption Indicator (AECI)
- Luminaire energy efficiency
- LED module energy efficiency
- Power Factor
- Lighting control features
- Energy consumption metering

- Colour temperature & Colour rendering
- Colour consistency
- Illuminance and luminance

- Light distribution (uniformity of light distribution)
- Light pollution
- Glare protection (disability and discomfort glare)
- Ingress protection (IP rating)
- Impact Protection (IK rating)
- IEC protection
- Overvoltage protection

- Mark of conformity for all components
- Lifetime
- Warranty
- Availability of spare parts
- Ease of repair and recycling

Introduction of 2 metrics for road lighting systems

- Energy efficiency indicator
  **PDI - power density indicator** ($D_P$)

- Annual energy consumption indicator
  **AECI - annual energy consumption indicator** ($D_E$)

- Joint evaluation of both indicators!
- Consider periods with different illuminance levels (according to EN 13201-1)
- Evaluation for all relevent traffic zones
Power Density Indicator

**PDI - Power Density Indicator (D\textsubscript{P})**

\[
D_P = \frac{P}{\sum_{i=1}^{n} \left( \frac{W}{lx \cdot m^2} \right)}
\]

- \(P\) is the system power of the lighting installation used to light the relevant areas, in W;
- \(\overline{E_i}\) is the maintained average horizontal illuminance of the sub-area “i”, in lx;
- \(A_i\) is the size of the sub-area “i” lit by the lighting installation, in m\(^2\);
- \(n\) is the number of sub-areas to be lit.
Annual Energy Consumption Indicator

AECI - Annual Energy Consumption Indicator \((D_E)\)

\[
D_E = \frac{\sum_{j=1}^{m} (P_j \cdot t_j)}{A} \left[ \frac{kWh}{m^2 \cdot a} \right]
\]

- \(P_j\) is the operational power associated with the \(j\)th period of operation, in W;
- \(t_j\) is the duration of \(j\)th period of operation profile when the power \(P_j\) is consumed, over a year, in h;
- \(A\) is the size of the area lit by the same lighting arrangement, in m\(^2\);
- \(m\) is the number of periods with different operational power \(P_j\); \(m\) shall also consider the period over which the quiescent power is consumed.
## Award criteria including TCO information

<table>
<thead>
<tr>
<th>Award criterion</th>
<th>Weighting [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cost criteria based on TCO</strong></td>
<td>50</td>
</tr>
<tr>
<td>TCO</td>
<td></td>
</tr>
<tr>
<td>Investment costs</td>
<td>15</td>
</tr>
<tr>
<td>Electricity costs</td>
<td>20</td>
</tr>
<tr>
<td>Maintenance costs</td>
<td>15</td>
</tr>
<tr>
<td><strong>Quality and design criteria</strong></td>
<td>30</td>
</tr>
<tr>
<td>Lighting quality</td>
<td>20</td>
</tr>
<tr>
<td>Design</td>
<td>10</td>
</tr>
<tr>
<td><strong>Warranty, design for recycling</strong></td>
<td>20</td>
</tr>
<tr>
<td>Warranty</td>
<td>10</td>
</tr>
<tr>
<td>Availability of spare parts, Design for recycling</td>
<td>10</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>100</td>
</tr>
</tbody>
</table>
Life Cycle Costing Tool

Excel based tool with two scenarios:

- New installation (comparison of three solutions)
- Retrofit (comparison of three solution with the replaced system)

Input sheet (example)  
Output sheet (example)
LCC Tool Parameters

**Input**

**Financial parameters**
- Price
- Cost of electricity and staff
- Change of cost of electricity and staff (%/a)

**Technological parameters**
- Power
- Dimming option
- Replacement schedule
- Cleaning and maintenance data

**Output**

**Expenses**
- Total
- Purchase and installation
- Energy
- Maintenance

**Annual expenses**

**Diagrams**
- annual expenses
- distribution of costs
Best Practice: „Grüne Mitte“, Linz AG

- Park and pavement lighting
- 42 LED park luminaires and 18 pavement luminaires
- Basic brightness 20%
- Motion detection (by pedestrians, cyclist or vehicles): nearest luminaire ramp up within 2 seconds to full operation.
- No motion detected: 15 seconds lagged and dimmed to 20% basic brightness within 5 seconds

Energy saving: 67%
## Best practice: Zürich (CH)

<table>
<thead>
<tr>
<th></th>
<th>before</th>
<th>after</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lighting class</td>
<td>M4</td>
<td>Depending on traffic</td>
</tr>
<tr>
<td><strong>Lamp type / power</strong></td>
<td>LED / 90 W</td>
<td>LED</td>
</tr>
<tr>
<td>Control</td>
<td>Power down in night</td>
<td>Dynamic with power down</td>
</tr>
<tr>
<td>Sensor</td>
<td>-</td>
<td>Optical sensor for traffic count</td>
</tr>
<tr>
<td>Operating hours</td>
<td>2.700 h/a</td>
<td>1.900 h/a</td>
</tr>
<tr>
<td>Energy consumption</td>
<td>240 kWh/a LP</td>
<td>170 kWh/a LP</td>
</tr>
<tr>
<td>Saving</td>
<td>-</td>
<td><strong>30 %</strong></td>
</tr>
</tbody>
</table>

Source: topstreetlight.ch, 2016
Trainings & seminars
Indoor and street lighting

Programm
• Central legal framework conditions
• Quality and efficiency
• Intelligent lighting concepts
• Service and repair
• Procurement criteria

Interactive workshop element
Based on modular training material:
www.premiumlightpro.eu/education/
Presentations at international events

Ecoprocura 2018, Nijmegen

10th International Conference IEECB&SC’18, Frankfurt, 2018

COP 24 Katovice 2018
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