

PREMIUM **LIGHT** *PRO*



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:
Development and implementation of directives, e.g. Building Guideline, Ecodesign Directive, Renewable Energy Directive, Energy Efficiency Directive

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 | EⁿR)



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
- Politecnico 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

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).

Criteria, guidelines & information services

- Criteria for Green Procurement.
- Guidelines for design and implementation
- Product database.
- TCO tool

**optimal
LED systems in
the service sector**

Website www.premiumlightpro.eu



About us

Indoor lighting

Outdoor lighting

Education

Events and News

Use our free planning tools!

Find out about project activities in your country:

Austria
Czech-Republic
Denmark
Germany
Italy
Poland
Portugal
Spain
UK



 **Indoor Lighting**



Best Practice



Funding

 **Outdoor Lighting**



Best Practice





Funding



Funded by
the European Union






Guidelines „LED street lighting“ & „Indoor Lighting“

PREMIUM LIGHT PRO  

LED Street Lighting
Procurement & Design


Guidelines



PREMIUM LIGHT PRO  

Indoor Lighting
in the Public and Private Service Sectors

Guidelines



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

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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

Efficiency metrics – system level:

EN 13201-5: Energy performance indicators

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 relevant traffic zones

Power Density Indicator

PDI - Power Density Indicator (D_P)

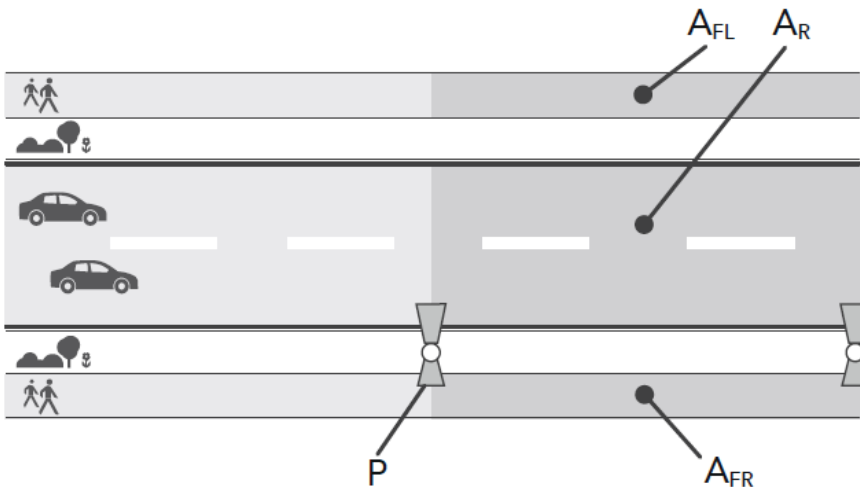
$$D_P = \frac{P}{\sum_{i=1}^n (\overline{E}_i \cdot A_i)} \quad \left[\frac{W}{lx \cdot m^2} \right]$$

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

AECEI - Annual Energy Consumption Indicator (D_E)

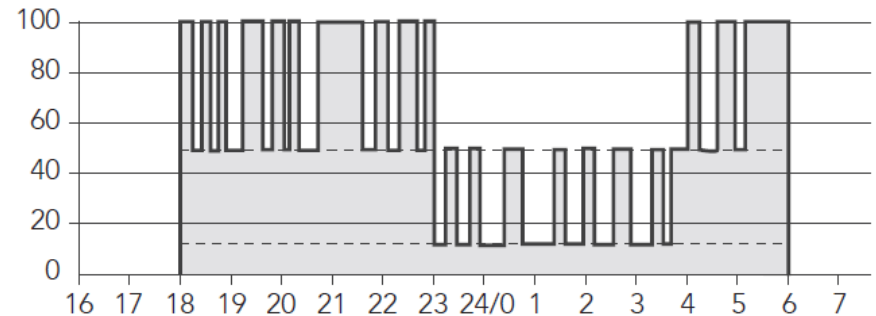
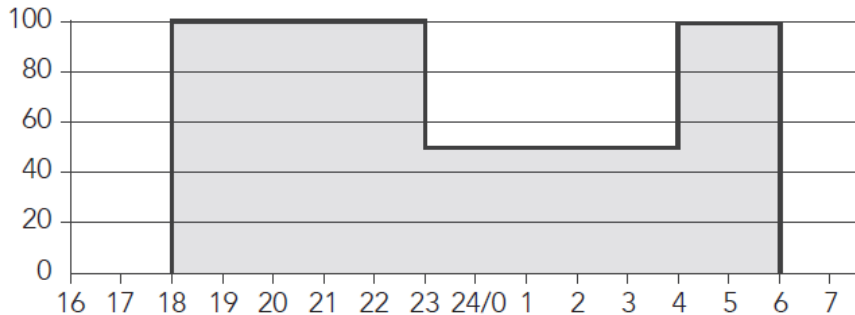
$$D_E = \frac{\sum_{j=1}^m (P_j \cdot t_j)}{A} \quad \left[\frac{kWh}{m^2 a} \right]$$

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

Award criterion		Weighting [%]
Cost criteria based on TCO		50
TCO	Investment costs	15
	Electricity costs	20
	Maintenance costs	15
Quality and design criteria		30
	Lighting quality	20
	Design	10
Warranty, design for recycling		20
	Warranty	10
	Availability of spare parts, Design for recycling	10
TOTAL		100

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)

new installation

total number of luminaires: 4300

product	nr	1	2	3
name		LED 1	LED 2	LED 3
price per unit	€	200	300	300
lifetime	h	50000	70000	50000

power	W	300	300	320
operation time not dimmed	h/day	12	8	12
dimming	yes/no	yes	yes	no
power when dimmed	%	100	70	70
operation time dimmed	h/day	0	4	0
overall weighted operation time	h/yr	4300	3942	4300

max. luminous flux degradation	%	20	20	20
time until luminaire replacement	yr	7,8	10,7	6,8
unplanned failures	%/yr	0,2	0,5	2,6
installation time	min/pc	12	12	12
cleaning interval	yr	6	6	3
cleaning time	min/pc	3	3	3
repair time	min/pc	8	10	12
diagonal cost	€/pc	10	10	10
recycling value	€/pc	0	0	5
levelise rate	€/pc/yr	0	0	0

replacement plan 1

replacement plan 2

replacement plan 3

introduction / base data / input new installation / results new installation / input replacement / results replacement / calculation new install

Input sheet (example)

results and comparison

cost comparison

	provider 1	provider 2	provider 3
total	€ 19.280.497	€ 19.242.559	€ 22.305.486
purchase and installation	€ 950.780	€ 1.418.274	€ 763.783
energy	€ 16.365.614	€ 14.729.053	€ 19.648.737
maintenance	€ 1.964.103	€ 3.095.233	€ 1.902.966

annual cost

total cost

introduction / base data / input new installation / results new installation / input replacement / results replacement / calculation new install

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

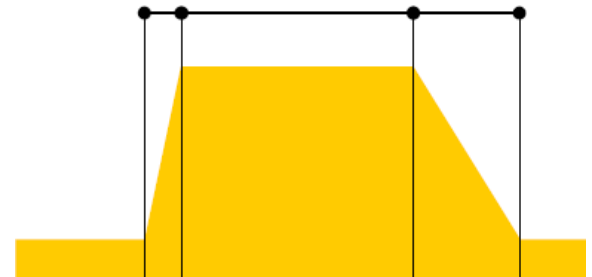
Diagrams

- 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 %

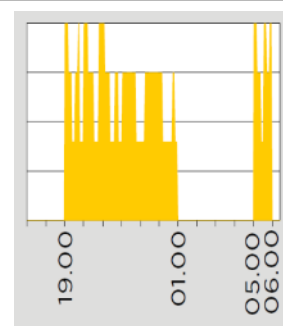
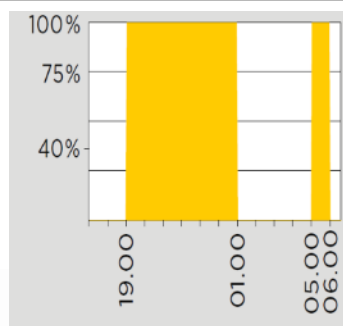


Source: Linz AG, 2016

Best practice: Zürich (CH)

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

Switching pattern



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



COP 24 Katowice 2018

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

Contact

Alfred Schuch

alfred.schuch@energyagency.at

Thomas Bogner


thomas.bogner@energyagency.at

Austrian Energy Agency

T. +43 (0)1 586 15 24 - 0

Mariahilfer Straße 136 | 1150 Vienna | Austria

www.energyagency.at

 @at_AEA



Funded by
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