



LED VERLICHTING

“BEZINT EER GE BEGINT”



Verlichtingseisen Parkeergarages

De verlichtingseisen ten aanzien van lichtsterkte zijn:

	NEN12464-1	NEN2443
Parkeerplaats	75	40
Rijstroken	75	40
In- en uitritten (dag)	300	200*
In- en uitritten (nacht)	75	100*
Lift en trappenhuizen	100	100
Kassa's, balies, betaalautomaten	300	200
* op 1 m hoogte		

De weergegeven waarden zijn in lux (Em) op de vloer tenzij anders aangegeven.

- NEN-EN 12464-1
- NEN-EN 2443
en voor de noodverlichting
- NEN-EN 1838

Enkele redenen voor ombouw van fluorescentie naar LED



Energiebesparing

Specificatie TL versus LED:

- TL: T8 - 1x58W/14W;
- TL: T5 – 49W/6W;
- LED: ± 30W;



Operationele kosten

Besparing op:

- Energiekosten;
- Onderhoudskosten;
- Levensduur garantie;



End-of-life

Bijvoorbeeld:

- Installatie wordt afgekeurd o.b.v. NEN 3140 keuring;
- Frequentie van storingen neemt toe;



Upgrade naar norm

Bijvoorbeeld:

- Licht kwaliteit voldoet niet aan de norm(en);
- Onderscheidend in licht beleving met lichtniveaus boven de norm;
- Optimaal lichtontwerp



CO₂ besparing & subsidie

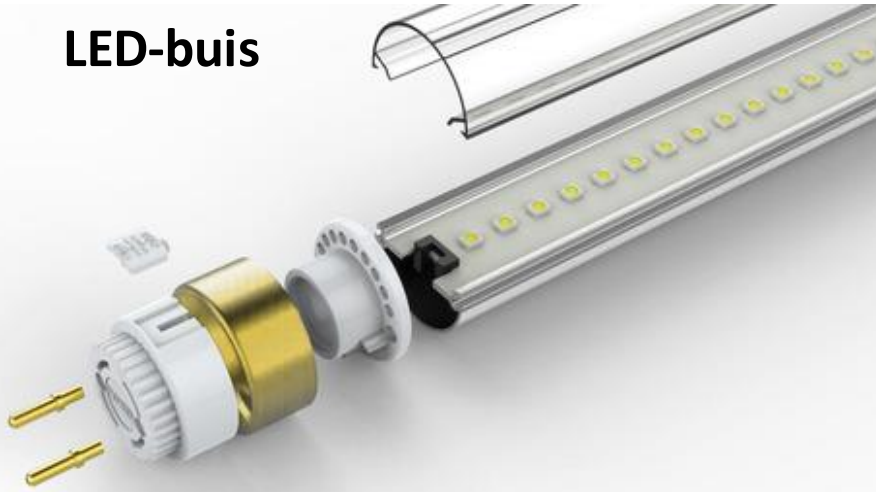
Bijvoorbeeld:

- 0,054 kg/kWh CO₂ reductie;
- Subsidie bij > 100 lumen/watt;

LED-armatuur



LED-buis



LED-oplossingen

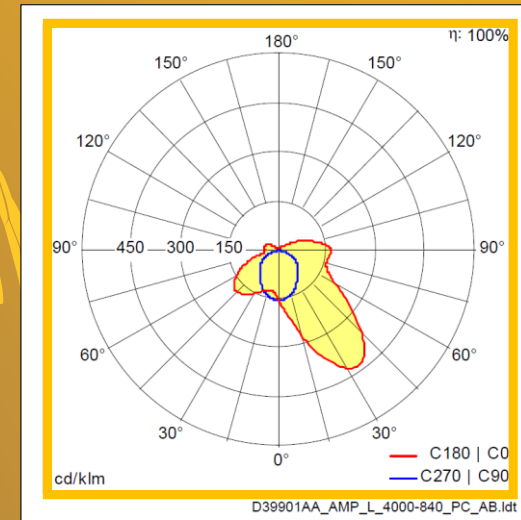
LED-armatuur versus LED-buis

- TL-buis is een rondstraler en optiek brengt juiste lichtspreiding;
- LED-buis heeft een beperkte stralingshoek en bestaand optiek levert zeer beperkte bijdrage aan lichtspreiding;
- LED-armatuur heeft een optimaal optiek voor lichtspreiding toegesneden op de toepassing zoals bijv. asymmetrisch, wide beam, etc.

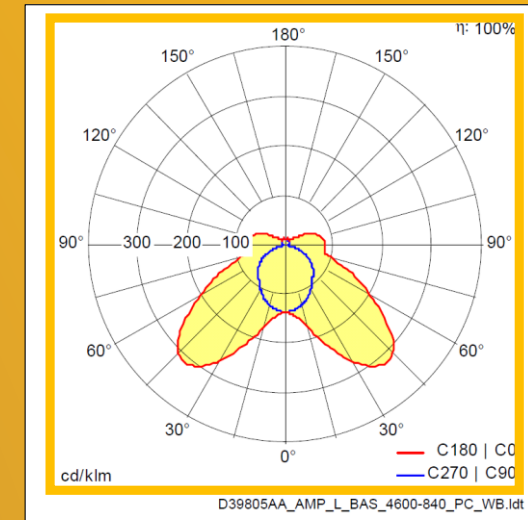
KEUZE LED-ARMATUUR

OPTISCHE VERSCHILLEN VOOR JUISTE
SPREIDING VAN HET LICHT EN HET BEREIKEN
VAN EEN GOED VERLICHTINGSNIVEAU EN
GELIJKMATIGHEID CONFORM EISEN EN
RICHTLIJNEN VRAAGT OM TOEPASSING VAN
HET JUISTE ARMATUUR OP DE JUISTE
POSITIE

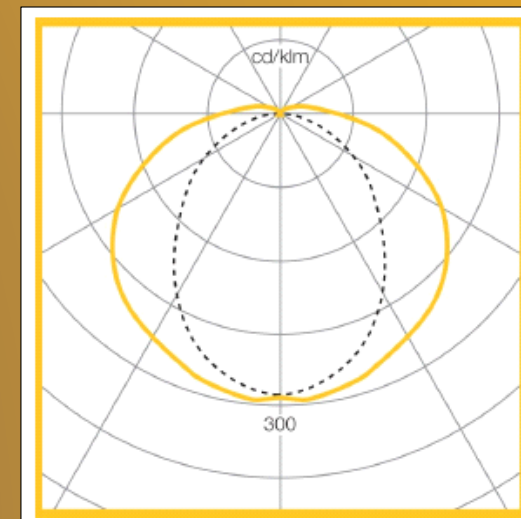
Asymmetrical Beam



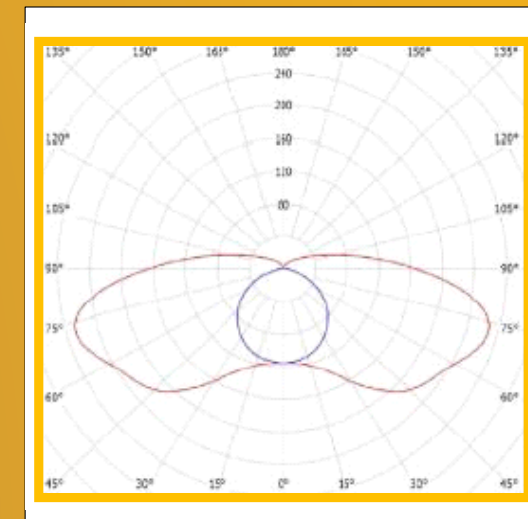
Wide Beam



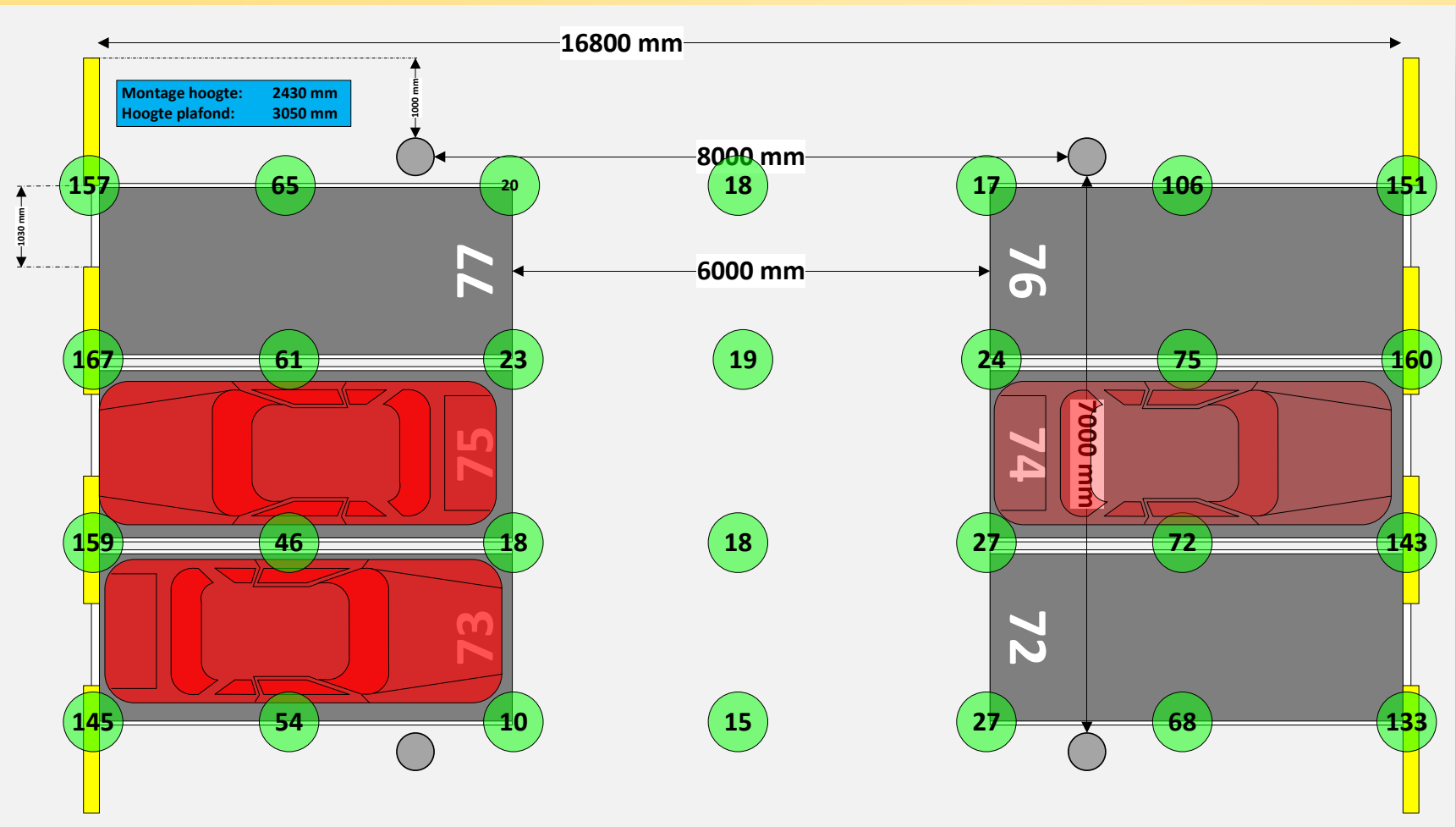
Narrow Beam



Wide Beam



Voorbeeld (huidige situatie)

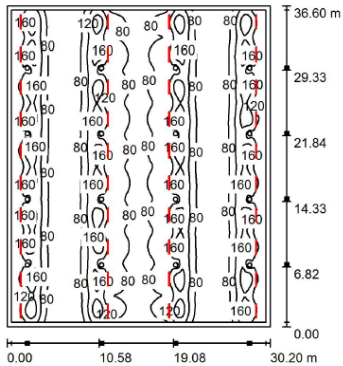
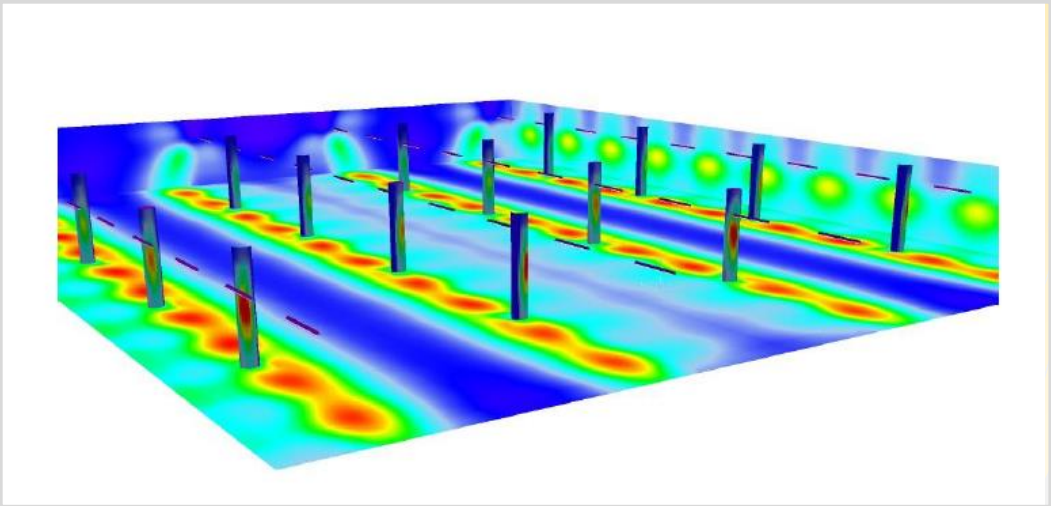
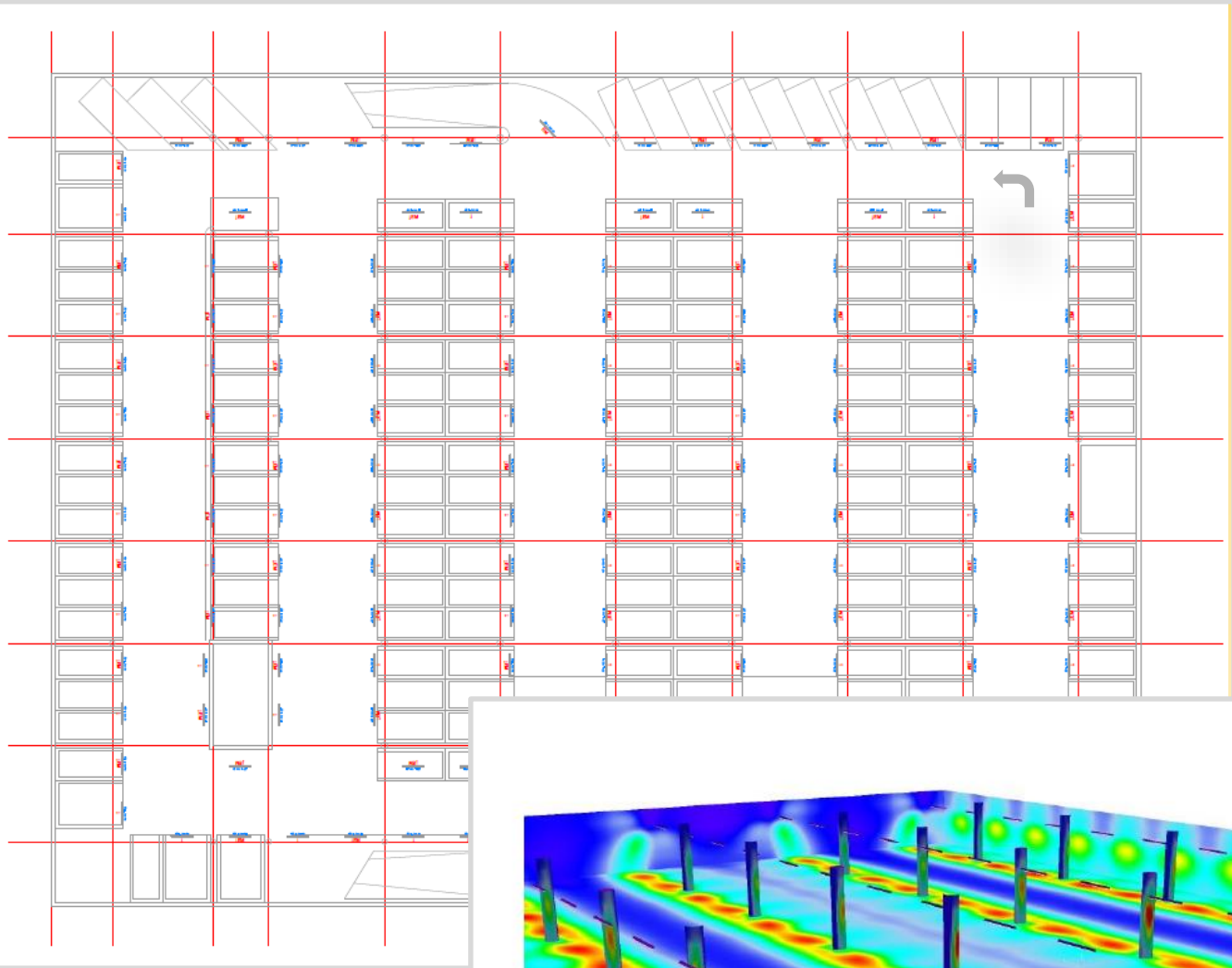


Gemiddelde verlichtingswaarde:
Gelijkmatigheid ($E_{\min} / E_{\text{gem}}$):

71,36 lux
0,21



Ombouw naar LED verlichting



Height of Room: 3.180 m, Mounting Height: 2.450 m, Maintenance factor: 0.80

Values in Lux, Scale 1:470

Surface	ρ [%]	E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	$u0$
Workplane	/	100	43	198	0.430
Floor	31	100	44	200	0.440
Ceiling	32	49	32	77	0.661
Walls (4)	59	82	39	161	/

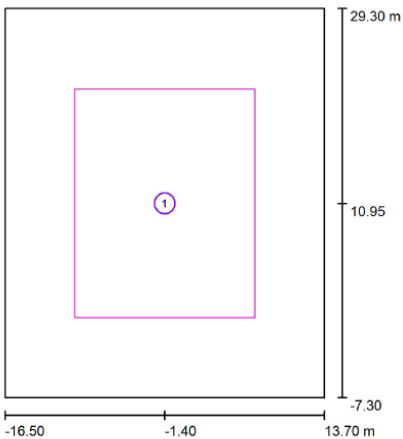
Workplane:

Height: 0.000 m
Grid: 128 x 128 Points
Boundary Zone: 0.500 m
Illuminance Quotient (according to LG7): Walls / Working Plane: 0.812, Ceiling / Working Plane: 0.487.

Luminaire Parts List

No.	Pieces	Designation (Correction Factor)	Φ (Luminaire) [lm]	Φ (Lamps) [lm]	P [W]
1	40	Zumtobel 42186391 AMP L 4000-840 PC AB EVG (STD) (1.000)	4040	4040	28.5
Total:			161600	161600	1140.0

Specific connect



Scale 1 : 417

Calculation Surface List

No.	Designation	Type	Grid	E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	$u0$	E_{min} / E_{max}
1	Parking area	perpendicular	128 x 128	97	52	197	0.535	0.265

Huidige situatie versus nieuwe situatie

Huidige situatie

- Aantal armaturen: 103
- Type armatuur: 1x58W-T8 (72W) TL
- Aantal branduren/jaar: 8.760 uur



Gemiddelde verlichtingswaarde: 71,3 lux
Gelijkmatigheid: 0,21

Nieuwe situatie

- Aantal armaturen: 150
- Type armatuur: AMP L4000-840 PC AB – 30W
- Aantal branduren/jaar: 12 uur op 100%
12 uur op 15%
door middel van Master/Slave
met ingebouwde bewegingssensor



Gemiddelde verlichtingswaarde: 97 lux
Gelijkmatigheid: 0,535

**Standaard nog 20% dimming ter
beschikking (norm 75 lux)**

Huidige situatie versus nieuwe situatie – Energieverbruik & -kosten

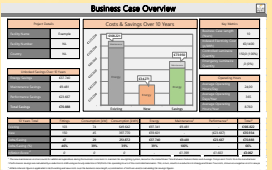
Huidige situatie

- Aantal armaturen: 103
- Type armatuur: 1x58W-T8 fluorescentie
- Aantal branduren/jaar: 8.760 uur
- Verbruik/jaar:
 $103 \times 72\text{W} \times 8.760 \text{ uur} = 64.964 \text{ kWh}$
- Energiekosten/jaar:
 $64.964 \text{ kWh} \times \text{€ } 0,14 = \text{€ } 9.095$

Nieuwe situatie

- Aantal armaturen: 150
- Type armatuur: AMP L4000-840 PC AB – 30W
- Aantal branduren/jaar: 12 uur op 100%
12 uur op 15%
door middel van Master/Slave met ingebouwde bewegingssensor
- Verbruik/jaar:
 $150 \times 30\text{W} \times 8.760 = 39.420 \text{ kWh}$
- Besparing o.b.v. Master/Slave:
(12 uur op 15%) = 16.750 kWh
- Energiekosten/jaar:
 $22.670 \text{ kWh} \times \text{€ } 0,14 = \text{€ } 3.174$

**20% extra dimming economisch
buiten beschouwing gehouden**

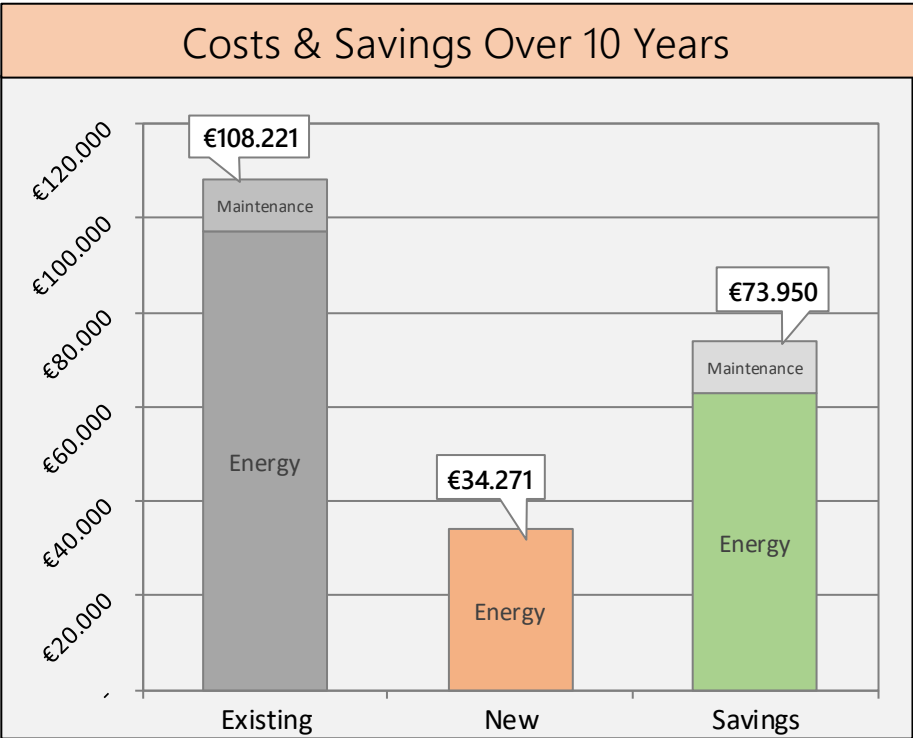


Business Case Overview



Project Details	
Facility Name	Example
Facility Number	NL
Country	NL

Unlocked Savings Over 10 Years	
Energy Savings	€37.740
Maintenance Savings	€9.481
Performance Savings	€23.667
Total Savings	€70.888



Key Metrics	
Business Case Length (Years)	10
Indexed Electricity Cost (p/kWh)	€0,1400
Controlled Luminaire Quantity	150,0 (100%)
Emergency Luminaire Quantity	,0 (0%)

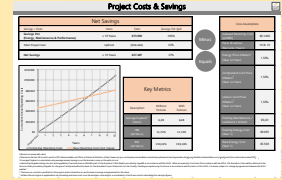
Operating Hours	
Average Operating Hours/Day	24,00
Average Operating Days/Year	365
Average Operating Hours/Year	8.760

10 Years Total	Fittings	Consumption [kW]	Consumption [kWh]	Energy	Maintenance ¹	Performance ²	Total ³
Existing	103	74	649.642	€97.341	€9.481	-	€106.822
New	150	45	397.770	€59.601	-	(€23.667)	€35.934
Delta/Saving	47	29	251.872	€37.740	€9.481	€23.667	€70.888
Delta/Saving (%)	46%	39%	39%	39%	100%	-	66%
Inflation Excess ⁴	0	0	0	-	€1.399	€1.663	€3.062

¹ The new maintenance cost accounts for additional expenditure during the business case term to maintain the new lighting system, based on the stated Mean Time Between Failures Rates and Average Component Costs from the manufacturer.

² Performance savings are calculated by a reduction to kWh using an hourly reduction of 50,0% for the operating hours of the controlled luminaires. This, in turn, results in a reduction to Energy and Green Tax costs, shown as a negative cost to new p;

³ Inflation Excess figure is applicable to both existing and new costs over the business case length, a combination of both are used in calculating the savings figures.



Financials

Cost & Savings

Project Costs & Savings

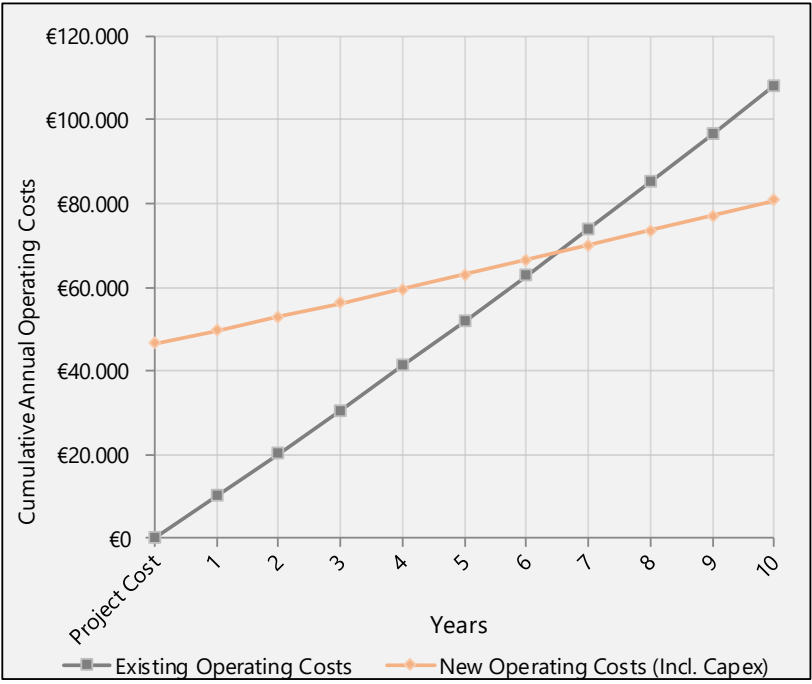


Net Savings			
Savings / Costs	Years	Total	Savings Pot Split
Savings Pot (Energy, Maintenance & Performance)	x 10 Years	€73.950	100%
Total Project Cost	Upfront	(€46.463)	63%
Net Savings	x 10 Years	€27.487	37%

Minus

Equals

Core Assumptions	
Indexed Electricity Cost (p/kWh)	€0,1400
Parts & Labour Warranty (Years)	10 & 10
Energy Price Inflation ¹ (Year on Year)	1,50%
Component Cost Price Inflation ² (Year on Year)	1,50%
Labour Cost Price Inflation ² (Year on Year)	1,50%
Existing Maintenance / Luminaire / Annum	€9,20
Existing Energy Cost (Year 1)	€9.095
New Energy Cost (Year 1)	€5.569



Key Metrics		
Description	Without Failures	With Failures
Average Payback ³ (Years)	6,28	6,28
IRR (10 Years)	11,74%	11,74%
ROI (10 Years)	159,16%	159,16%

¹Based on review with client.

² Based on the last 36 months worth of RPI data available via Office of National Statistics (<https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/bulletins/indexoflabourcostsperhourilch/octoberto december2017>)

³ Average Payback is calculated using average annual savings over the business case vs the upfront cost

collected by Supplier during site visit and supplied by Customer and constitutes part of the Business Case Report provided by Supplier in accordance with the MSA. When accepted by Customer in accordance with the MSA, this Business Case will be reflected in the Service Order provided by Supplier for the given Facility and will be the basis for the Baseline Project Reduction for the Facility. Pending acceptance by Customer in accordance with the terms of the MSA, it remains subject to change by agreement between the MSA parties."

² There are no controls specified for this project and so therefore no performance savings are generated for the client.

³ Inflation Excess figure is applicable to both existing and new costs over the business case length, a combination of both are used in calculating the savings figures.



Energiebesparing
en verkleining
CO₂ footprint



Verbetering van
verlichtingsniveau
en lichtbeleving



Verbetering van de
onderhoudscyclus
d.m.v. 10 jaar garantie



Rendement op uw
investering of lighting
service provider heeft
perspectief

Conclusie

Omschakelen naar LED brengt met zich mee:

FUTURE ENERGY SOLUTIONS
Future Energy Solutions embarks on Europe's largest rollout of LED lighting for Q-Park

From survey and design, to installation, commissioning and maintenance
7 countries completed by December 2019

200 sites
100,000 installed luminaires

The Netherlands, Germany, Belgium, United Kingdom, France, Ireland and Denmark **Q-PARK**

Enhanced Lighting
offers a more welcoming and safe atmosphere for parking customers

an **efficient** and **best in class** solution

Localised installation
to maintain quality and control in each country
Localised maintenance
to provide short response times

Using **LED technology** can **reduce lighting bills** by up to **65%**

Using **lighting controls** can **reduce lighting bills** by a further **10%**

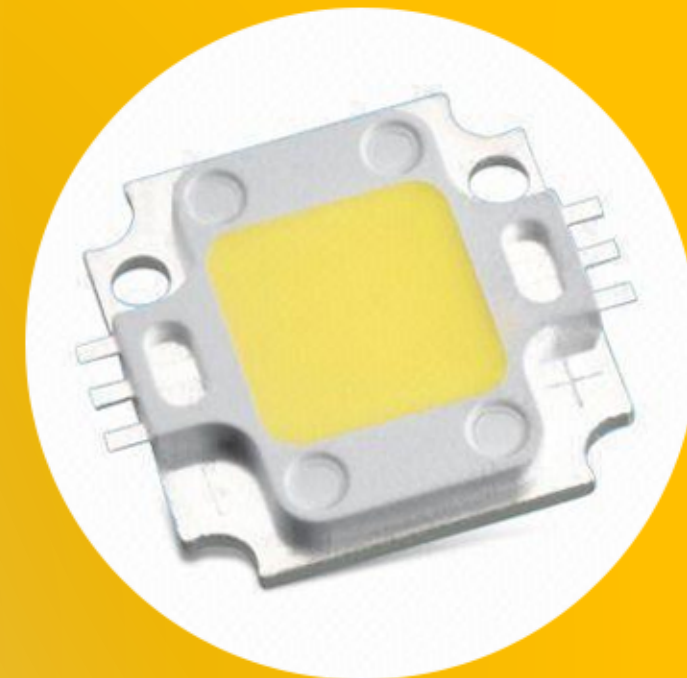
New lights are **FREE** from Mercury and other Hazardous Chemicals

100% Recyclable Lights

FUTURE ENERGY SOLUTIONS
1,100+ Customers
1,850+ Sites
450,000+ LED luminaires across the world

Q-PARK Quality in parking

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LED VERLICHTING

ALLES IN OGENSCHOUW NEMEND

“WAT LET ONS”



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