



**Award Winner
Gulf Traffic
2011**



**2 x Winner
Greenlight
Award**



Public Lighting Management Systems

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Who we are

EE-Consulting AG is the Sole Distributor for a number of companies in the Public Lighting Control and Tunnel Equipment Business.

Reverberi is the leading manufacturer of Public Lighting Management Systems and Tunnel Lighting Control Systems in Europe.



Reverberi

Reverberi has been in this business for some 25 years. With more than 60'000 units installed it is the major worldwide player in the industry and No.1 in the ME.

Continious research and develppment guarantee reliability and innovation and we have a reputation of looking after our customers.



Reverberi is a Greenlight
Parter of the European Union



Certified Quality

Eng. Thomas D. Baenziger



The Concept

Lighting is monitored and controlled in order to guarantee the proper functioning and to minimise the cost of operation.



Why Dim the Lights?

CIE and European Standards suggest, to reduce the lighting during off-peak hours (CIE115-2010)

A reduction of 50% is permissible

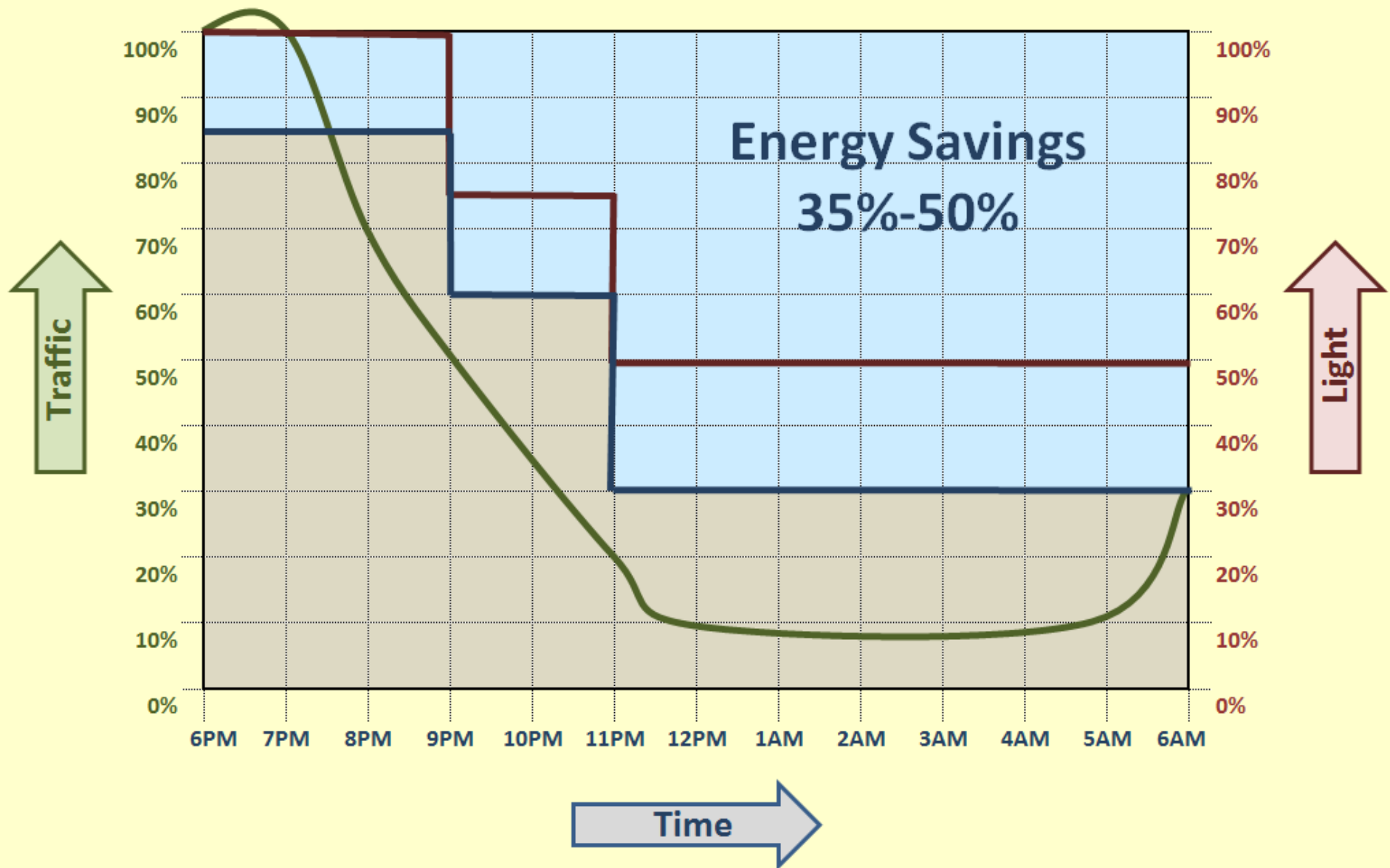


Standard



CIE and European Standards recommend to reduce lighting levels (but not uniformity) during off-peak hours.

The light is following the traffic density



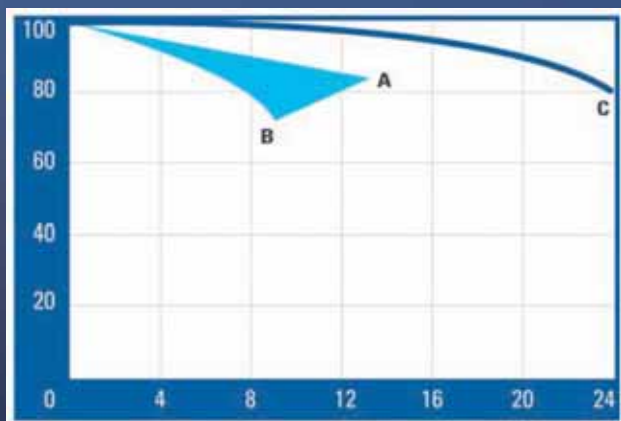


Important Points are....

- **reliability**
- **efficiency**
- **durability**
- **use of standard lighting equipment**
- **integration into other ITS systems**



Maintenance Cost Reduction



Luminaire components will last 2-3 times longer

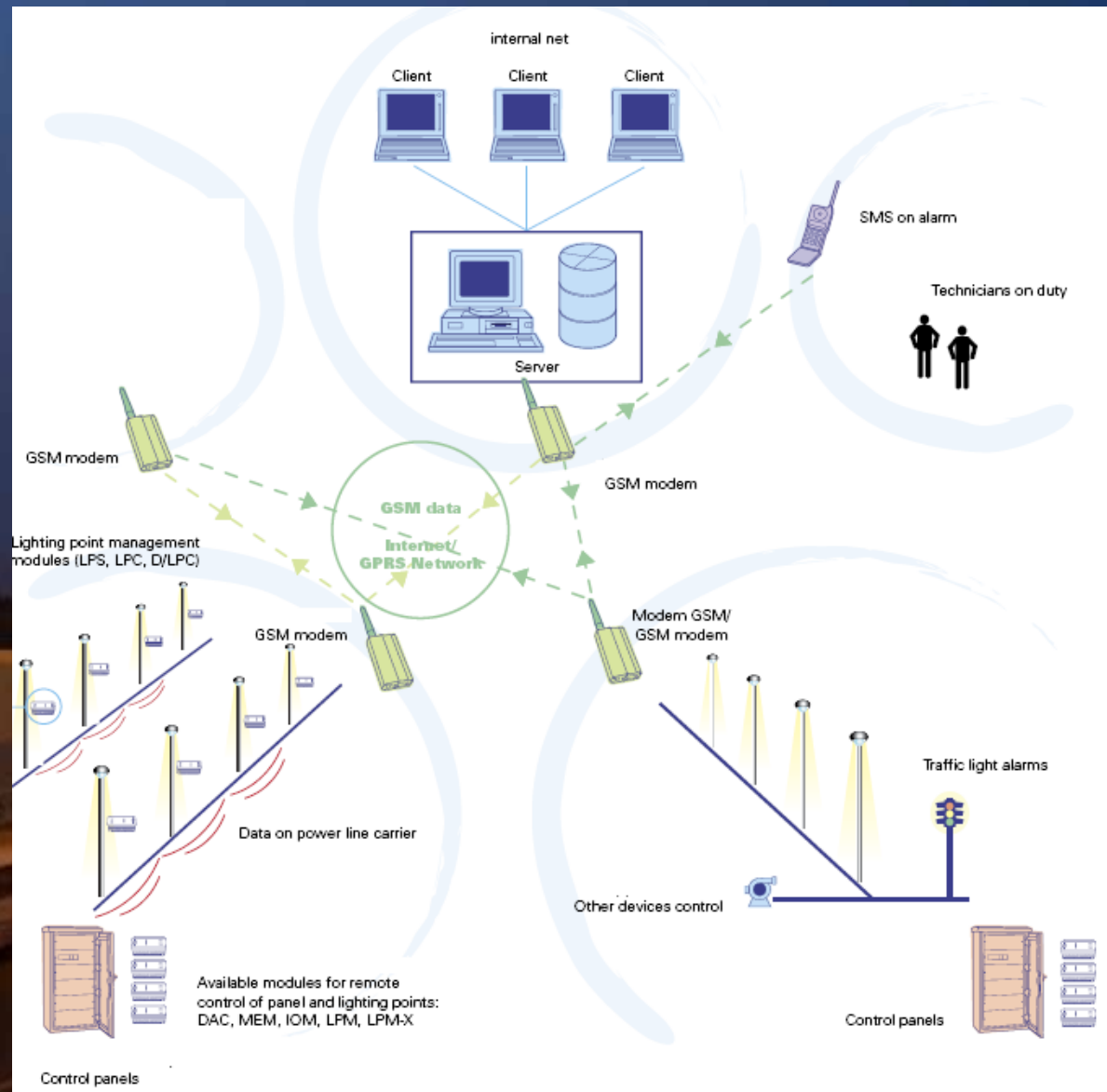
	before		after					2005
	2003	2004	2005	2006	2007	2008	2009	2009
Lamp replacement (HPS 150/250W)	574	634	94	90	61	71	124	440
Ballast replacement	238	182	35	12	7	10	24	88
Ignitor replacement	200	108	19	10	7	6	24	66
Capacitor replacement	66	25	6	0	6	4	12	28
General Interventions	37	19	4	1	2	2	2	11
Energy Cost Savings k€	0		105	144	172	191	208	820

Actual result of Bergamo



System Architecture

1. Server – Client based architecture with SQL data base.
2. Comprehensive software MAESTRO to manage scenarios and maintenance issues (500 page manual)
3. Full emulation and tele diagnostic features
4. All functions from center
5. Integration of GIS
6. Alarms by SMS
7. Communication to F/P by GSM
8. Pole to pole via Power Line Carrier (PLC)
9. Monitoring and dimming of each lighting point
10. No limit for expansions
11. **Very simple system, only two components: F/P and one type of pole module!**





Software



Maestro

MOVICON 9.1 - [RunTime] - MAESTRO - DB (REVERBERI ENETEC)

File Anagrafiche Visualizza Strumenti Eventi Dati Comunicazione ?

ANAGRAFICA

MAESTRO


- Berchidda
 - QDR00037
 - Punti Luce
- casarano
 - Q10
 - Q11
 - Q12
 - Q13
 - Q14
 - Q15
 - Q16
 - Q17
 - Q18
 - Q19
 - Q20
 - Q21
 - Q22
 - Q23
 - Q24
 - Q25

CARTOGRAFIE

LISTA cartografie

PreNie_corretto

ANAGRAFICA CORPO ILLUMINANTE

Apparecchio d'illuminaz.	Prima lampada	Seconda lampada		
Potenza [W]	150,00	Tipo	SAP	
Marca e modello	Philips - SON T - 12000,00			
Tipo di attacco	E40	Durata media [h]		8000
Stato di conservazione	NUOVO	Data di installazione		19/10/2004
Reattore	ET254	Condensatore		AD27362
Accenditore	hiqas7658	Tipo di modulo palo		NESSUNO
Numero modulo palo	0	Abilitazione in mappa		<input type="checkbox"/>
Note				
Immagine	C:\Programmi\Maestro\Image\HQL.jpg			

Abilita Modifiche Salva Modifiche Stampa

Quadro di comando - Impianto telesegregato con registro di potenza Reverberi LTO 22 KVA Totale punti luce - 121 Base - 1.200

X:+1461908.822238 Y:+4508621.804109

Elemento Corrente LBO00013

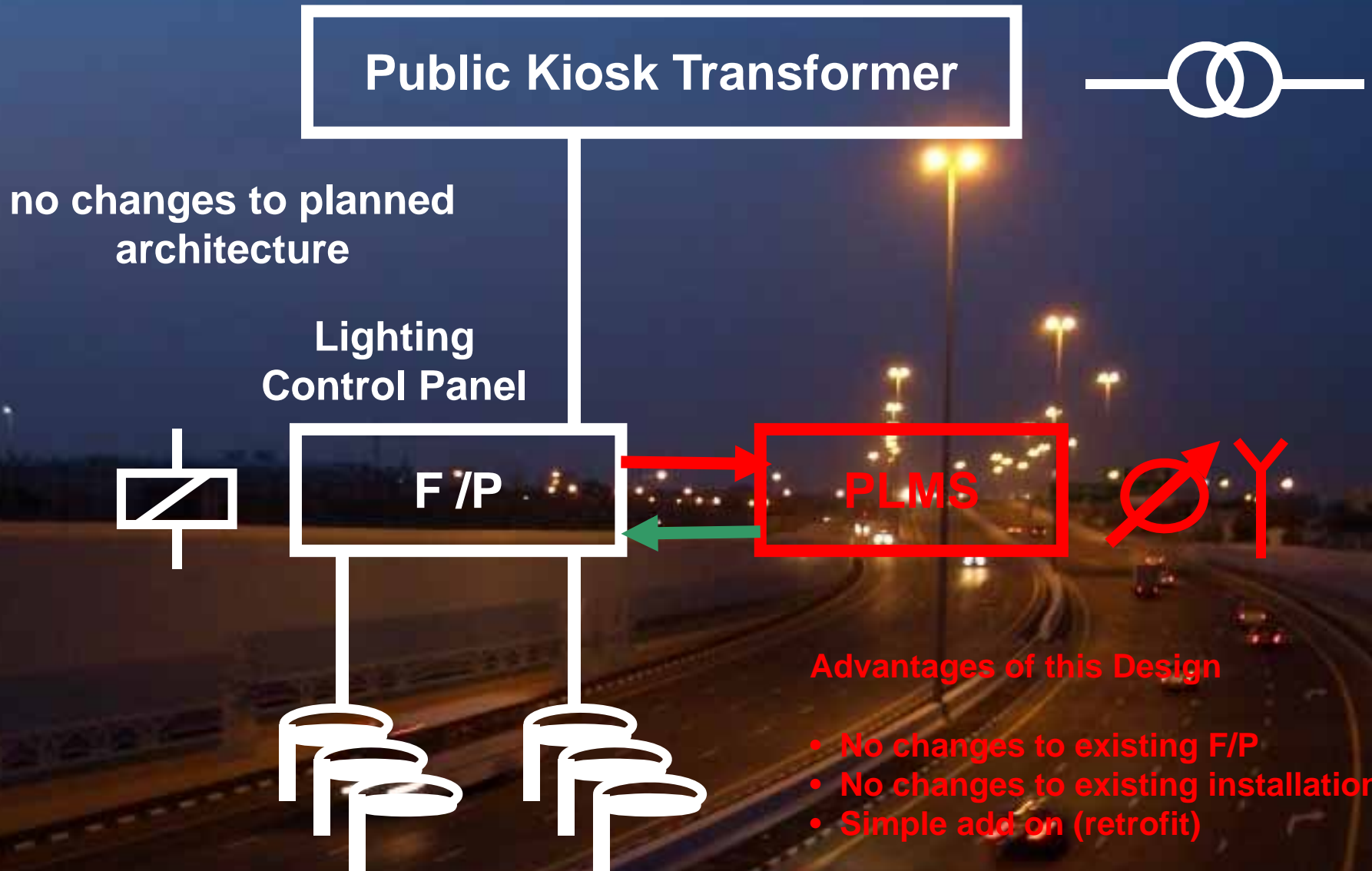
2005/01/29 19.11.34 Com.Driver - Error during connection: timeout elapsed Cuncta1.dvi



Microsoft SQL Server 2005



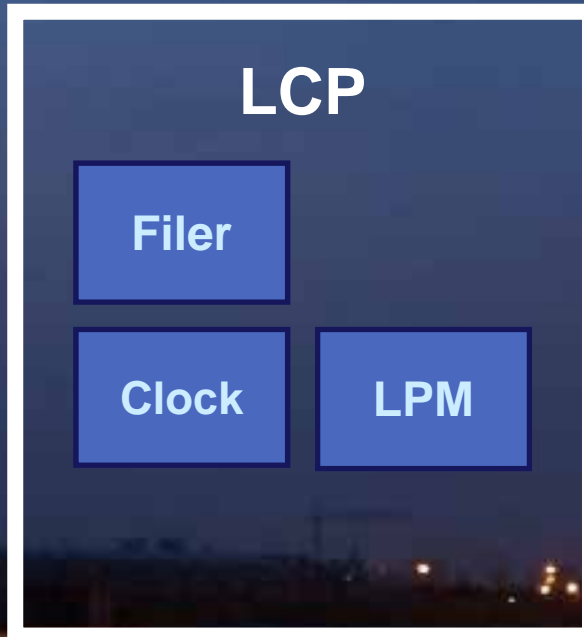
Simple Architecture HPS





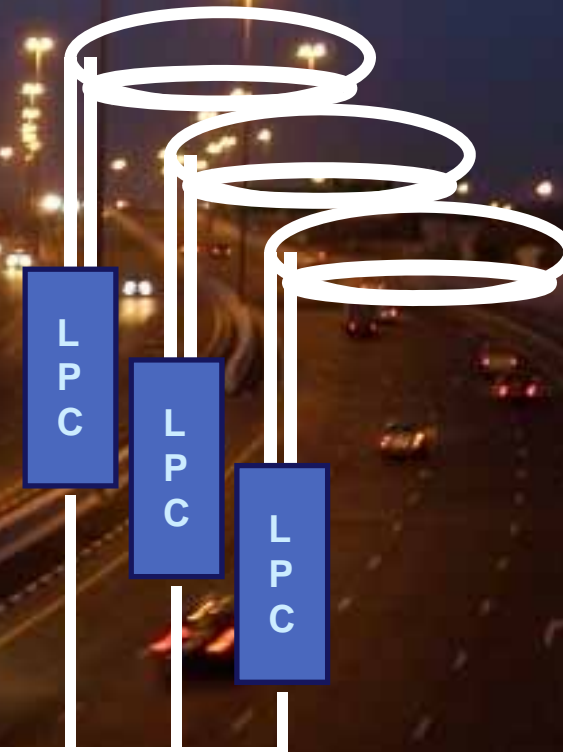
LED Installations

The installation is very simple!
4 components only need to be installed!



Standard lighting control Panel with Lighting Point Manger (LPM), Filter and time clock.

Standard cables
Standard luminaires
Any brand or type



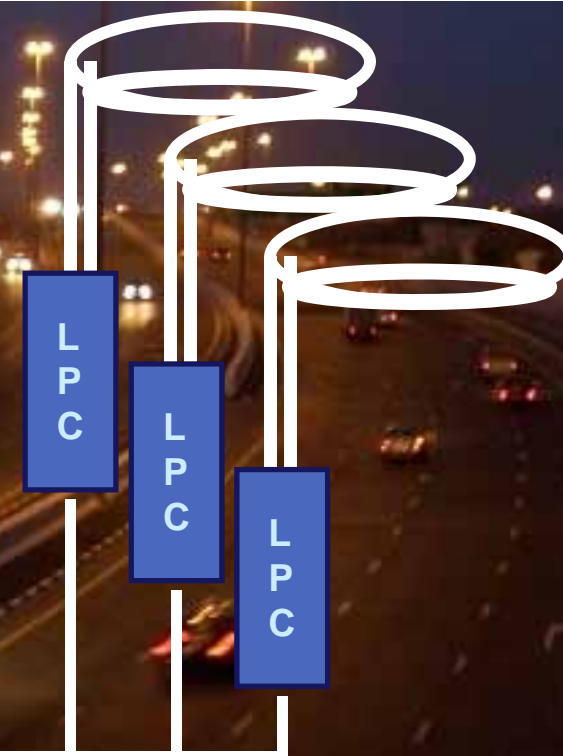


LPM



Standard lighting control Panel with Lighting Point Manger (LPM), Filter and time clock.

Standard cables
Standard luminaires
Any brand or type





LPM Programming

- Scene programming on PC
- Up to 998 LPCs on 16 groups
- Optional remote control

(Made in Italy)



Monitor for LPM

File

LPM Data | Managed poles | Scenario related to poles | Meters related to poles | Direct communication | Communication test

Identification codes
 User code: 0105 | Plant code: 1001 | Link: 1

Alarms management
 Nr. of calls: 5
 Allarm call sequence: 1* num.

Data of system
 Hour: 14:31:59 | Date: 12/10/2005
 DTR Correc.: 00 | ATR Correc.: 10
 Soft. release: 02:03 | Clock up date

Enabling
 Transf. scen.: Disabled | Continuous Poll.: Disabled | Scenario: Event
 Polling of min. consum.: Disabled | Polling of measures: Disabled | Daylight sav. time change: Enabled
 Time first polling: 15:40 | Time second polling: 16:15

Start/end daylight saving time
 Last | Sunday | March | Last | Sunday | October

Time based scenario

Scenery	Time	Gr.1	% red	Gr.2	% red	Gr.3	% red	Gr.4	% red	Gr.5	% red	Gr.6	% red	Gr.7	% red
Scen. Nr.1	05:00	10	0	00	0	00	0	00	0	00	0	00	0	00	0
Scen. Nr.2	09:00	10	0	00	0	00	0	00	0	00	0	00	0	00	0
Scen. Nr.3	10:00	00	0	00	0	00	0	00	0	00	0	00	0	00	0

On event scenario

Scenery	Gr.1	% red	Gr.2	% red	Gr.3	% red	Gr.4	% red	Gr.5	% red	Gr.6	% red	Gr.7	% red	Gr.8	% red
Scen. Nr.1	01	100	00	0	00	0	00	0	00	0	00	0	00	0	00	0
Scen. Nr.2	10	59	25	100	00	0	00	0	00	0	00	0	00	0	00	0
Scen. Nr.3	01	23	00	0	00	0	00	0	00	0	00	0	00	0	00	0

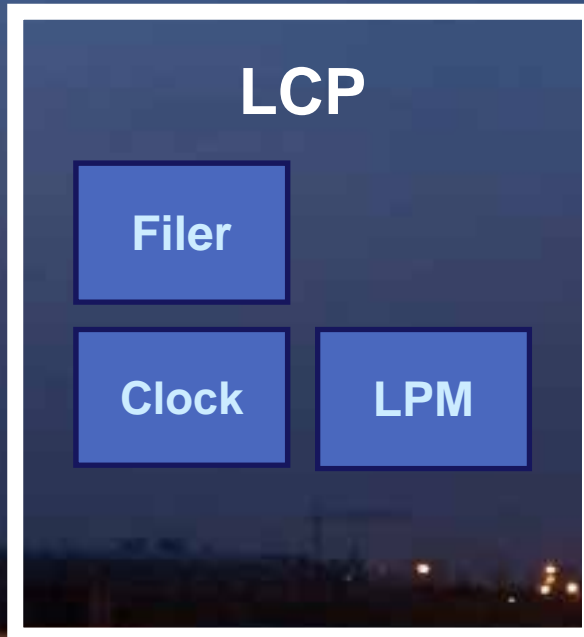
Connection
 COM1
 COM2
 COM3
 COM4
 COM5
 COM6
 COM7
 COM8
 Connect
 Connect with GSM
 Phone Nr.
 Connection state
 Connesso
 Disconnect

User code: 0105
 Plant code: 1001





LPM



Standard lighting control Panel with Lighting Point Manger (LPM), Filter and time clock.

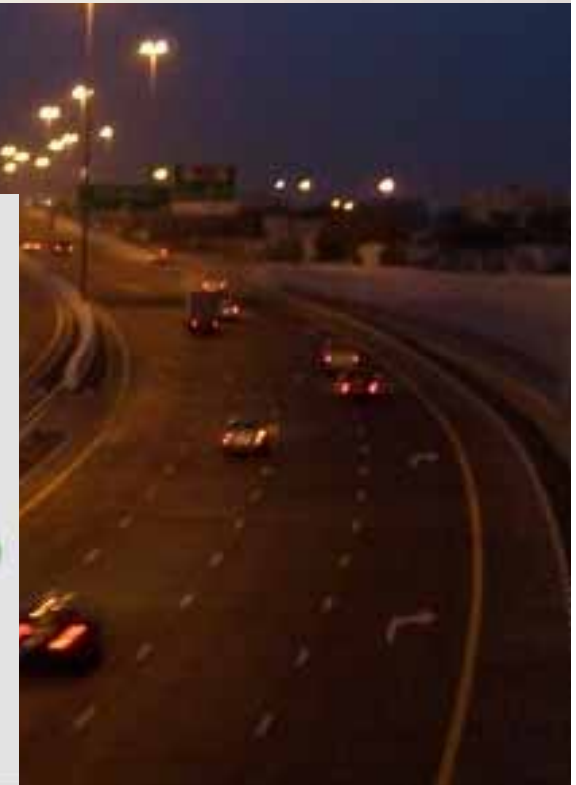
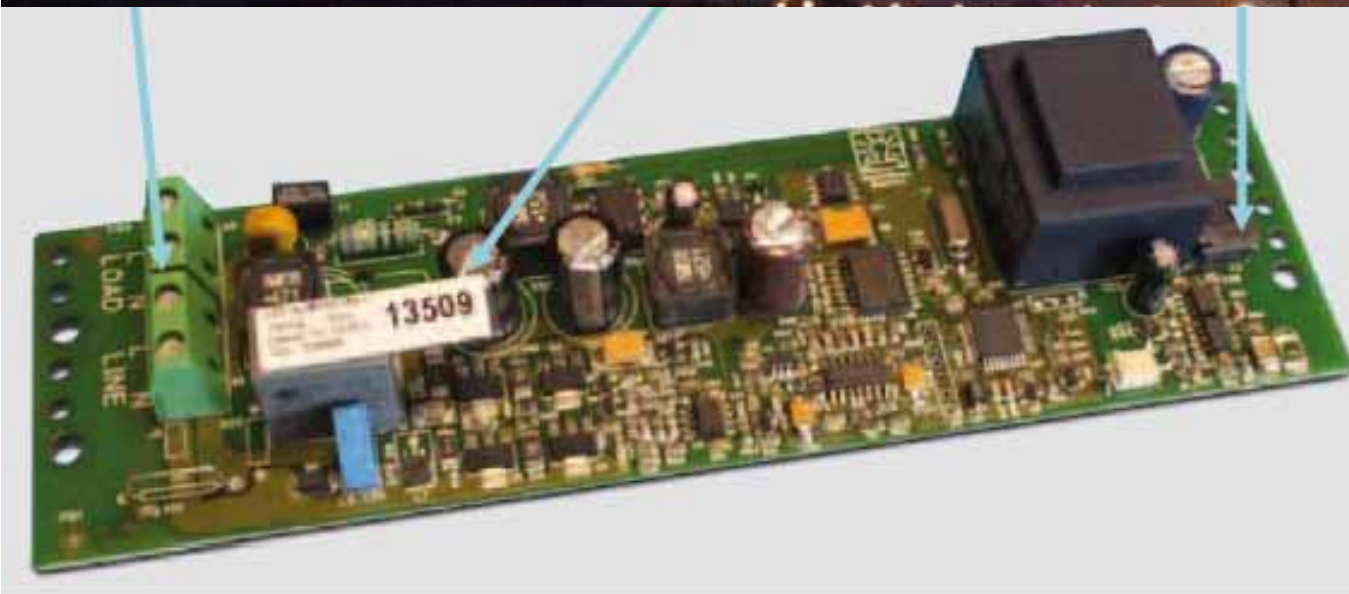
Standard cables
Standard luminaires
Any brand or type



LPM Technology

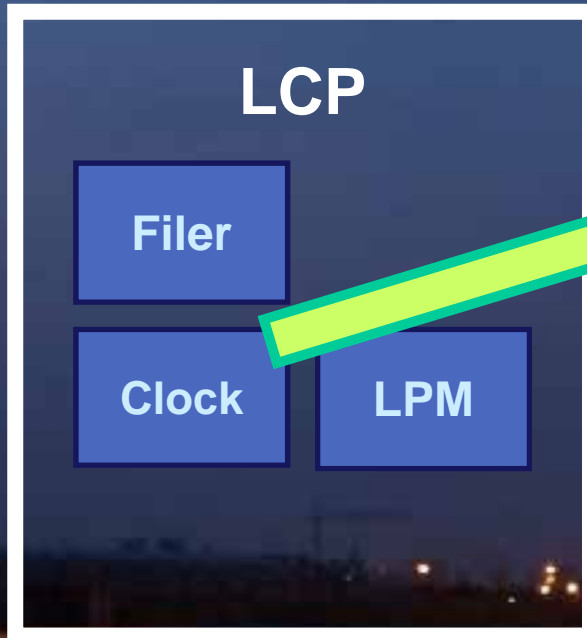
Power line communication
Each Lighting Point is addressed
All parameters are monitored

(Made in Italy)



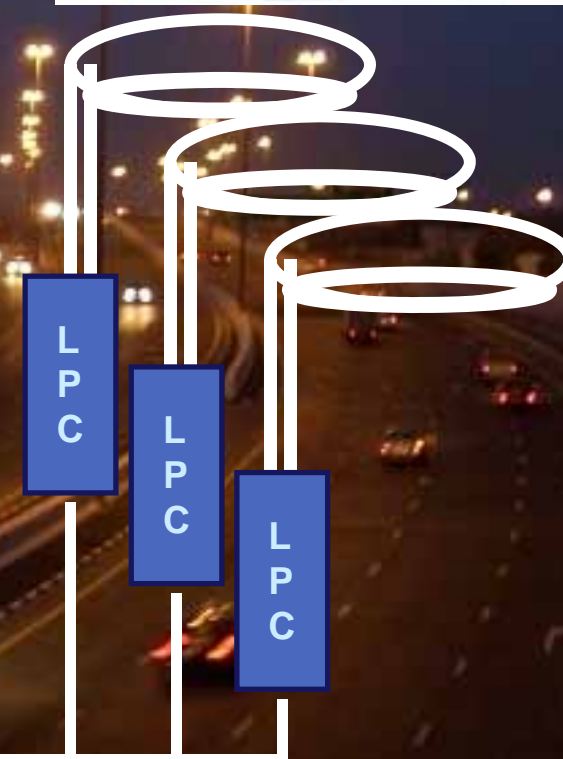


Installation



Standard lighting control Panel with Lighting Point Manger (LPM), Filter and time clock.

Standard cables
Standard luminaires
Any brand or type

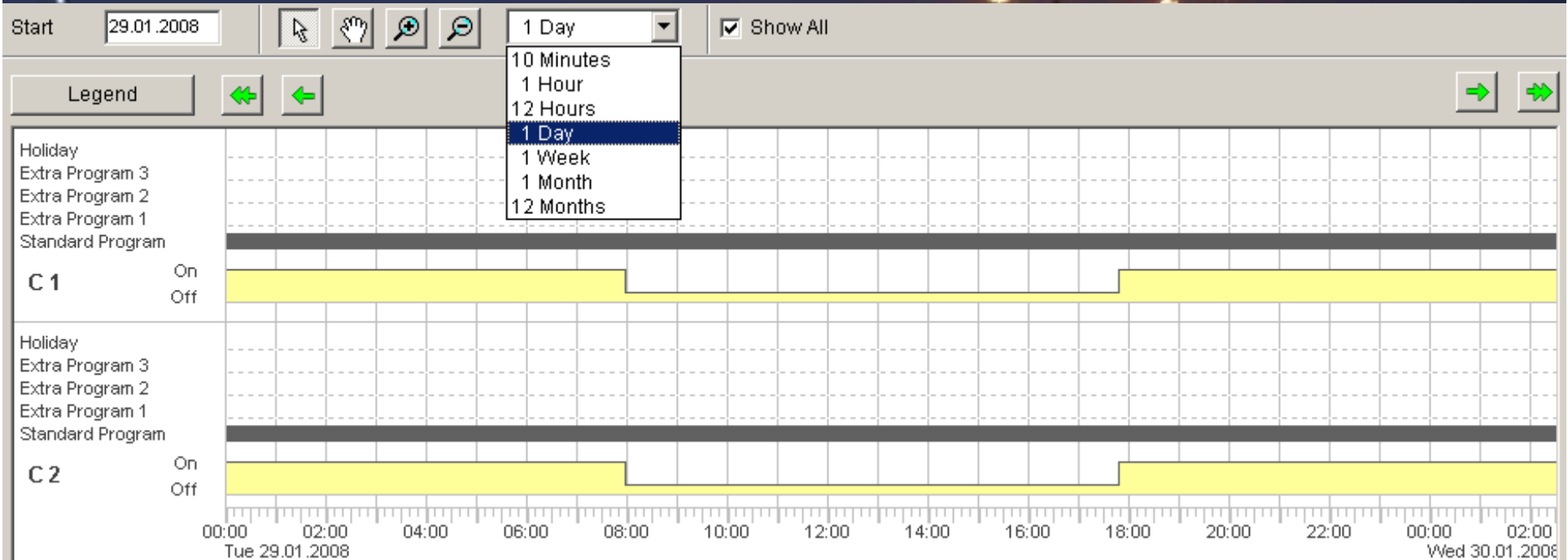




Timer Programming

- Timer for 365 days per year
- Weekens and Ramadan are different
- Programmed on PC
- Tranfuffed on Obelisk
- Fast and 100% reliable

(made in Germany)

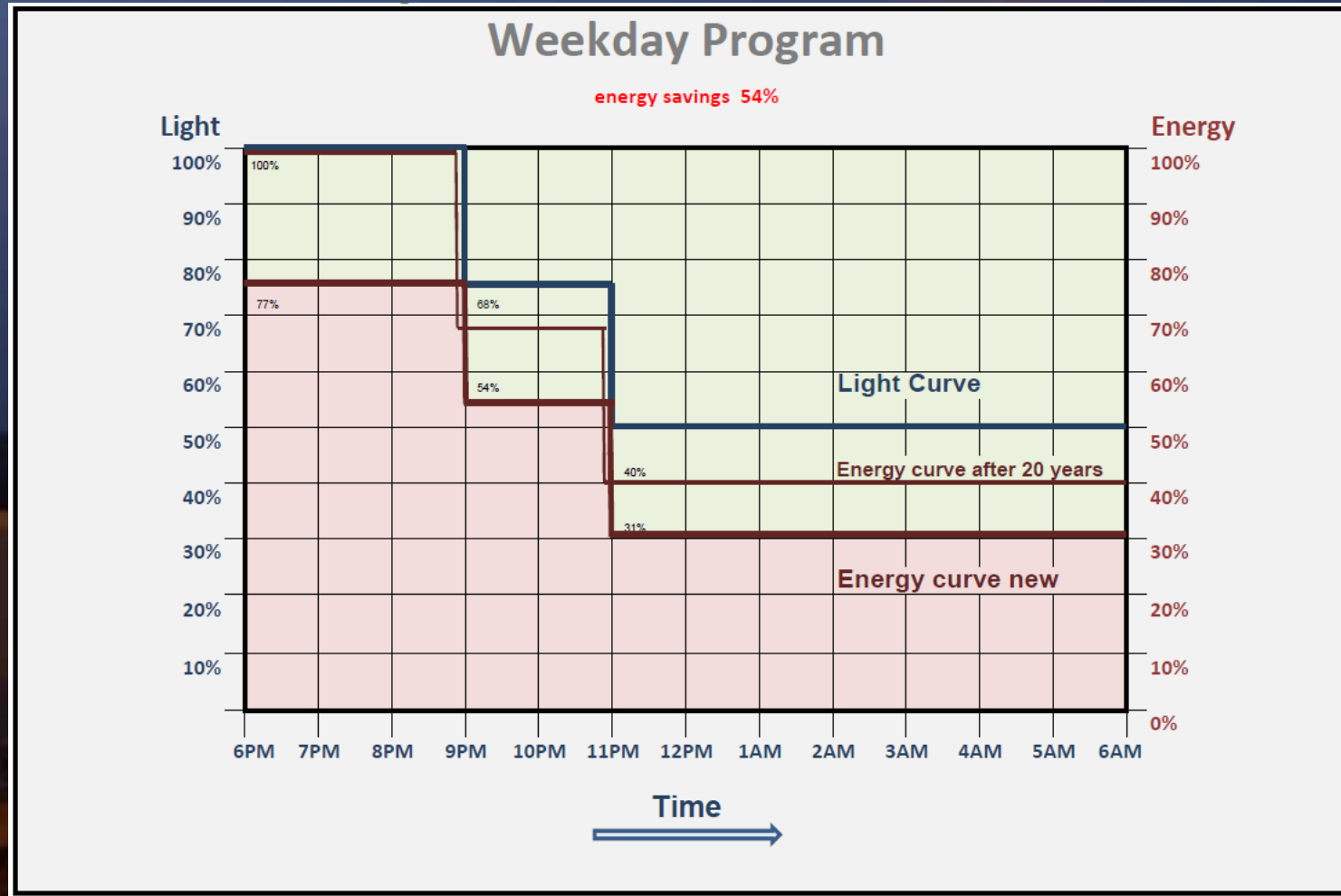




Dimming Schedule for Week Days



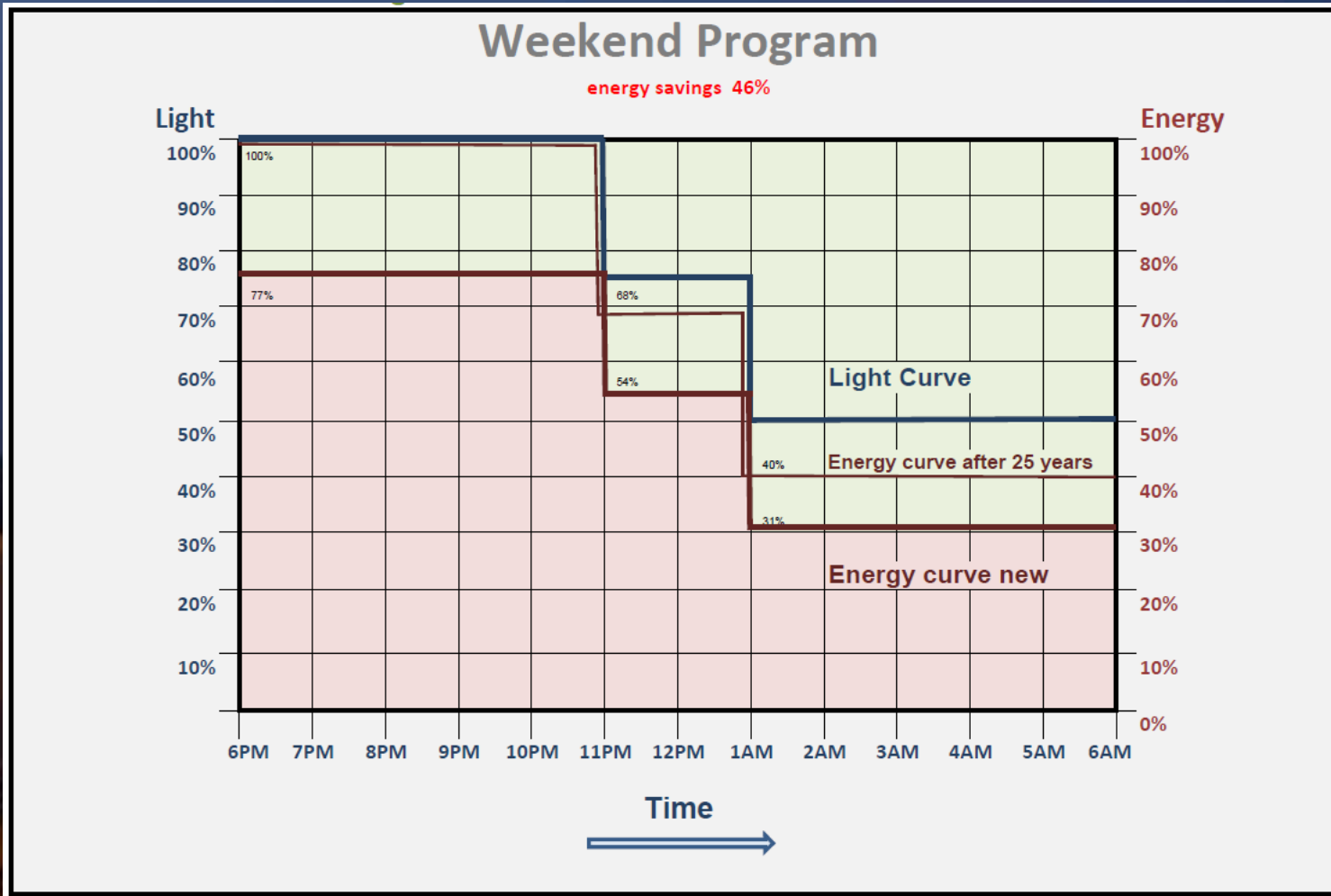
Energy Savings with LED Lighting 54%





Dimming Schedule for Weekend

Energy Savings with LED Lighting 46%

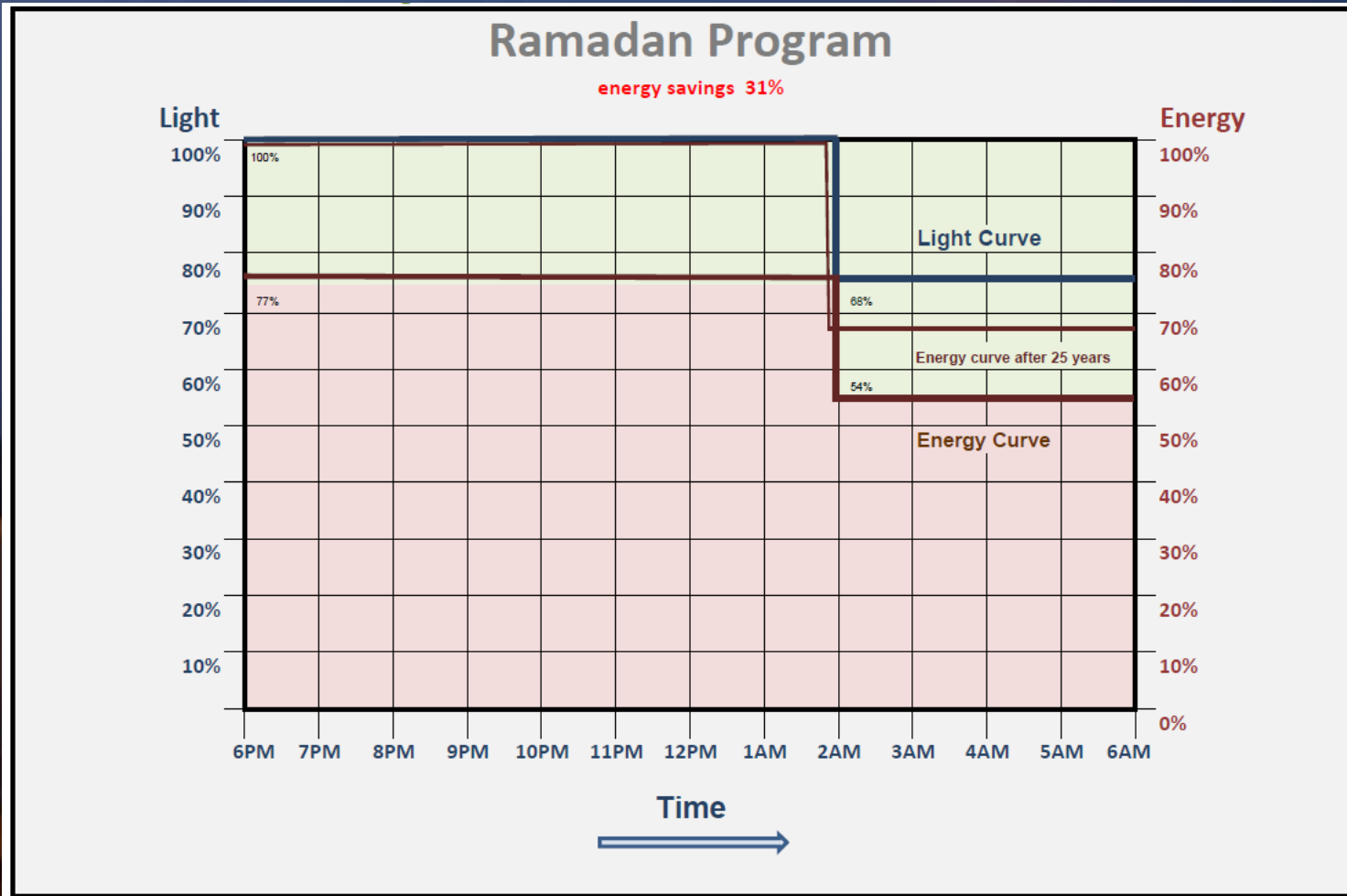


Lumen maintenance factor: 0.8



Dimming Schedule for Ramadan

Energy Savings with LED Lighting 31%



Lumen maintenance factor: 0.8



Return of Investment (ROI)

Case Study Shamkah Project

Shamkah is a mixed residential development covering around 4'000ha; 12'200 villas, and about 600km of roads. 18'073 LED luminaires light up this new city in the Abu Dhabi Emirate. It will be equipped with the latest technology PLMS using power line communication method.



Input Figures				
Power	A	LED	218	W
Losses	B	5%	11	W
Cost of Energy	C		0.40	AED/kWh
Operating Hours per day	D		12	h
Operating Hours per year	E	D x 365	4'380	h
Number of Luminaires	F		18'073	
Energy Savings new Installation with PLMS	G	LLF = 0.8	50%	
Installation Life Time	H		25	years



Return of Investment (ROI)

Results without PLMS				
Energy without PLMS p.a.	M	$(A+B) \times E \times F$	18'120	MWh
Cost of Energy without PLMS p.a.	N	$M \times C$	7'247'866	AED
Energy without PLMS 25 years	O	$M \times H$	452'992	MWh
Cost of Energy without PLMS 25 years	P	$N \times H$	181'196'645	AED

Results with PLMS				
Energy with PLMS p.a., new installation	Q	$M \times (1-G)$	9'081	MWh
Energy Cost with PLMS p.a. new installation	R	$Q \times C$	3'632'207	AED
Energy with PLMS 25 years	S	$Q \times H / 0.85$	267'074	MWh
Energy Cost with PLMS 25 years	T	$R \times H / 0.85$	106'829'609	AED

Savings of PLMS				
Energy savings p.a. new installation	U	$M - Q$	9'039	MWh
Energy Cost Savings p.a. new installation	V	$N - R$	3'615'659	AED
CO2 reduction p.a. (0.7 kg of CO2 / kWh)	W	$U \times 0.7$	6'327	t of CO2
Energy savings 25 years	X	$U \times H \times 0.85$	192'082	MWh
Energy Cost Savings 25 years	Y	$V \times H \times 0.85$	76'832'755	AED
CO2 reduction p.a. (0.7 kg of CO2 / kWh) 25 years	Z	$W \times H \times 0.85$	134'457	t of CO2



Return and Investment



Investment				
Cost of System	\$	budget	18'000'000	AED

Retrun				
ROI (Return of Capital)		\$ / V	5.0	Years

- Cost of energy assumed constant over 25 years
- Savings due to longer luminaire life not included
- Maintenance savings due to monitoring not included

**The PLMS will save more than AED4'000 per lighting point in 25 years!
This means that it will pay for itself and for the cost of the LED luminaires**



Conclusion

1. More Safety and Security

The proper operation of the lighting is monitored and problems are reported instantly. Actions can be taken.

2. Energy Savings 25-50%

Light is adjusted to the traffic density and the supply is stabilised. The energy consumption represents 76% of the total life cycle cost of a lighting installation.

3. Lower Maintenance and Operational Cost

Due to the dimming, stabilisation and soft starting, the lamps last up to 2x longer. Due to the monitoring maintenance actions can be scheduled.

4. Short Return of Investment

Due to the savings systems have an ROI of 4-5 years.



Approved by
Abu Dhabi Municipality
Abu Dhabi Department of Transport

Emirate of Abu Dhabi



Department of Municipal Affairs
Municipality of Abu Dhabi City
Internal Roads and Infrastructure Directorate

Lighting Specification



References

Abu Dhabi Khalifa Port PLMS

Abu Dhabi Salam Steeet Tunnel

Abu Dhabi Ras Al Akhdar Underpass

Aub Dhabi Baynunah Street Underpass

Dubai Airport Tunnel (RTA)

Dubai (RTA): 12 Tunnels

Dubai Public Ligting Management System

Dubai Jumeirah Village (Nakheel)

Dubai Marintime City

Bahrain (4 Tunnels),

Riyadh, Dammam,

Muscat Public Lighting

Qatar Public Lighting

Zurich, Rome, Berlin,



Local Partner



Reverberi Enetec
Lighting Management

**The best systems need local support.
EE-Consulting AG has local partners with
factory trained personnel in each country.**



Thank you!