



Power

Dynamics

Independence

Sustainability

Coherence

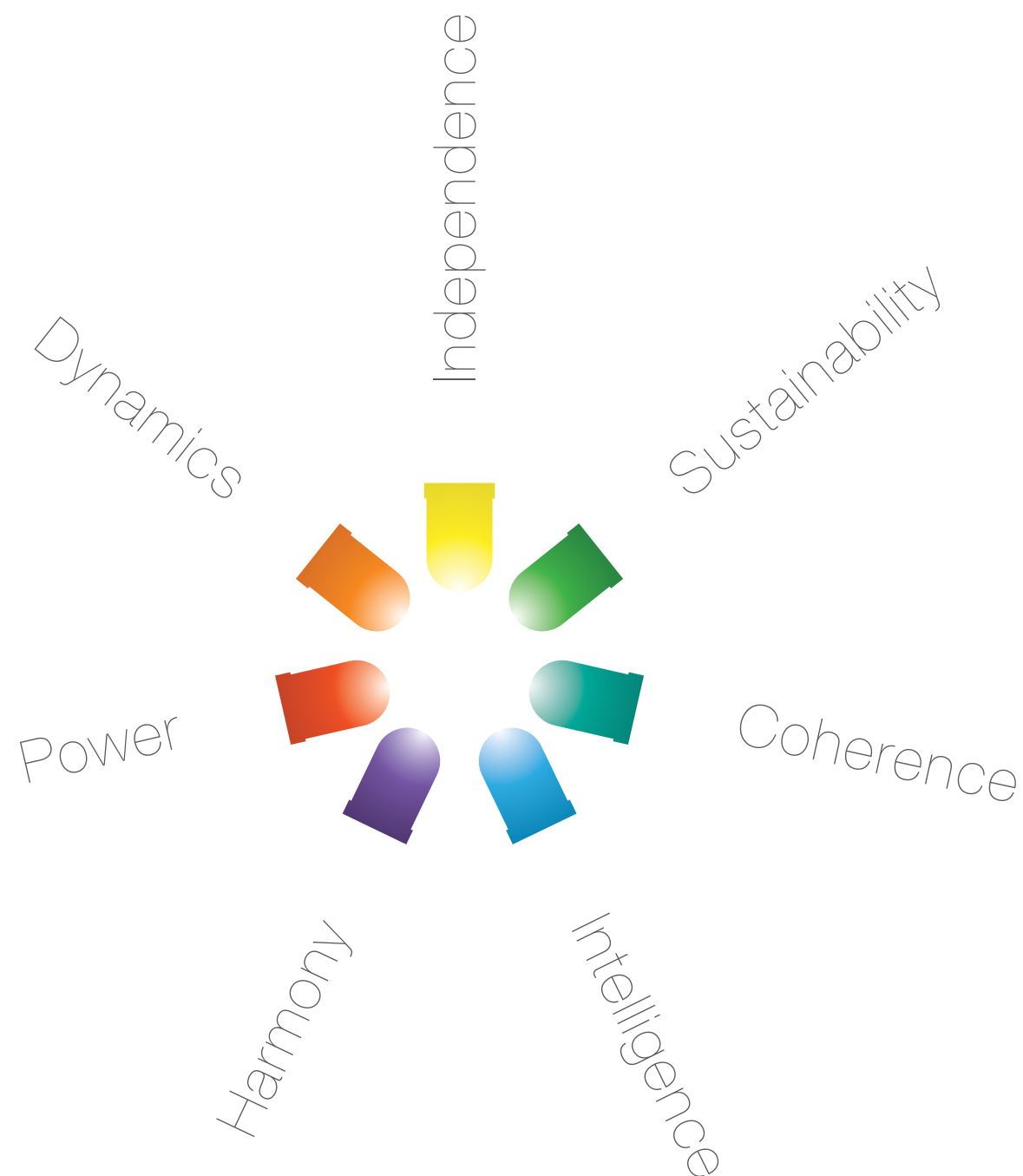
Intelligence

Harmony

Intelligent industrial LED lighting

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SES Lighting develops and manufactures intelligent industrial LED lighting, distinguished by its incredible energy efficiency as well as environment friendliness.

We are to thank our excellence to our clients. Their specific needs created most challenging projects. Delivered in demanding harsh environments of industrial halls these projects propelled us to provide excellent performance which yielded development of beLine® products known for their outstanding quality.

There are seven main principles, aspiring our excellence: Power, Intelligence, Independence, Coherence, Dynamics, Sustainability and Harmony. These guiding principles led us to create the technology that reduces consumption of electricity in average 80 % - with investment return in less than 3 years.

We are proud that our beLine® products were developed in harmony with the environment: beLine® technology reduces CO₂ emissions by up to 90 %.

With every successful project, we are realising our commitment to Sustainability and Harmony since additional tones of CO₂ emissions are reduced.

beLine® technology is a living organism due to its cutting edge technology that is under constant improving development process by our team of engineers, with its focus on information interaction between industrial hall and management.

Today, we are confident to say our beLine® products are leading products among industrial LED lighting in the world. To name only a few of the industries, where our products have made the most exceptional breakthrough, we can refer to: steel industry, foundries, metal manufacturing industry, wood industry, automobile industry, plastics industry, glass industry, paper industry, logistics centres and different storage facilities.

Our aim and goal is to continue growing and developing our technology as well as expanding it worldwide, with the main focus on client satisfaction. Most of all, we want to continue with developing win-win-win situations, where the first win goes to the environment, the second goes to the client and the third one represents the future development of beLine®.



The Power of beLine®

The essential element that assures energy effectiveness of the beLine® technology is LED (light-emitting diode) technology. LED technology was invented already in 1907; however, it took many decades to transform the findings of an early research into an effective final product. LED technology is not being used only in lighting installations but also in many other fields, especially in audio device industry. The advantages of LED technology are also useful in medicine.

LED diodes as a source of light

The main component of beLine® technology is the semiconductor diode. When put in gear, the energy in form of electromagnetic radiation is being emitted by the electrons. The radiation emits the frequency and if the frequency is in the field of sight, it is seen as a light. The colour of the light depends on the photon energy that can be regulated, depending on our needs.

The efficiency of LED diode is far higher from the efficiency of classic filament lights – this being a reason LED technology is perceived as the technology of future.

Technical Characteristics

Lifespan	up to 100.000 hours
Efficiency of the light	105 lm/watt
Power supply efficiency	93 %
Light temperature	4500 K
Recognition factor	RA > 75
Warranty period	5 – 10 years

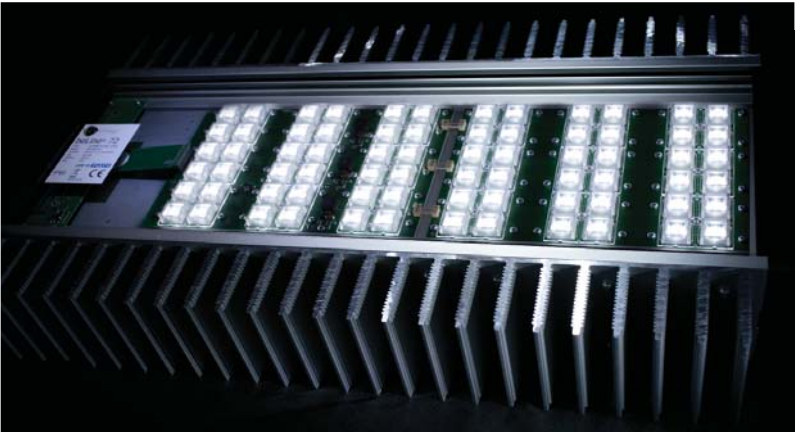
Other Features of the beLine® technology:

- In order to improve the beLine® products, the secondary optics was developed,
- with special electronics that we developed, the lamps can be remote controlled,
- anti-glare materials were used,
- the robust aluminium housing of typical ribbed configuration was used, assuring optimal heat dissipation from the lighting installation,
- toughened highly translucent glass with 96%-transmittance was used.

3th Generation of beLine® Technology

Currently, our clients are using 2nd generation of lamps; however, the 3th generation is already at the final stage of development and it will introduce some improvements of energy efficiency:

- improved efficiency of the lighting installation,
- longer lifespan due to improved cooling system,
- faster switching of the lighting system and lighting installation,
- improved vibration and stroke resistance (improved robustness of the product),
- these improvements will not affect the lighting installation's weight and size.





The Intelligence of beLine® Technology

Analysis of conditions in industrial halls has shown that working process of our clients has developed as well as time and financial aspects of process are becoming more and more complex. The power and efficiency of lighting technology thus cannot satisfy the unique needs of potential clients. This is why we have to provide them with unique solutions.

We developed the system that enables remote controlling of lighting installation - ILCS (Intelligent Lighting Control System) which, in addition, improves the energy efficiency. ILCS is a constituent part of our technology, introducing some improvements that distinguish beLine® products from our rivals:

- together with PIR (Passive Infrared) sensor, ILCS improves energy efficiency – it reduces energy use – it enables temporary and permanent dimming of lighting installations (depending on the ordinance for a particular workplace or presence status),
- ILCS enables remote controlling of lighting systems without additional energy loss or lifespan cuts.

Energy efficiency with ILCS

improved by 25 %

Lifespan with ILCS

longer for 48 months

On/off reaction time

instant in 0.1 second

Administrative costs

€ 0,00

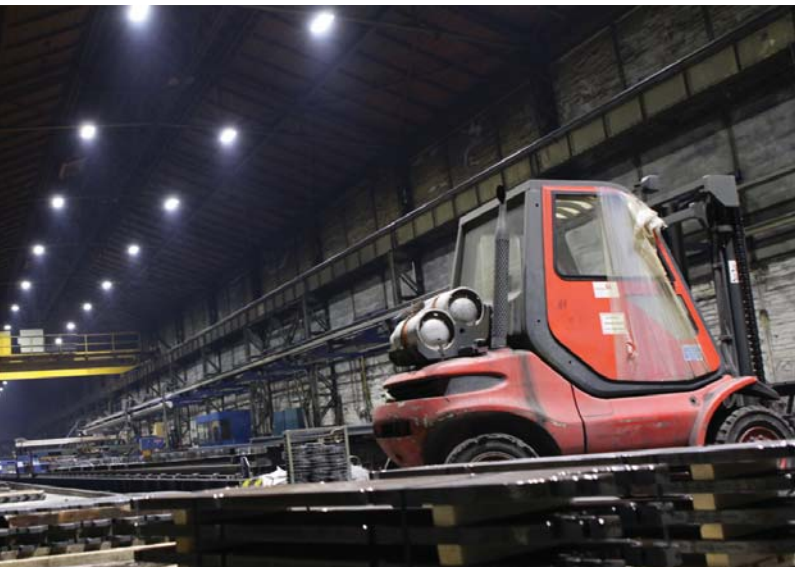
Changing the lighting regimes

Changes of workplace lighting can be determined by in advance defined time intervals. Time intervals can later on be adjusted to the new lighting demands (e.g. if new mechanical equipment, working activity or time periods are being introduced in a particular part of the industry hall).

Changes of lighting regimes do not require installation or lamp reorganisation from the client. Client can change the lighting regime without additional costs and after consulting SES Lighting engineers who prepare optimal lighting regime for particular workplaces.

ILCS additionally reduces energy use without reducing the lighting of the workplace with:

- semi-obscuration sensors according to the employee's presence/absence (e.g. 100% lighting in the event of present worker, 30% lighting in the event of absent worker),
- On/Off sensors in the event of quick passing by fork-lift trucks and other vehicles present in storage facilities.





The Independence of beLine® Technology

Comparison of lighting systems on the market indicates great technological advantage of beLine® products. be-Line® technology is distinguished for:

- longest lifespan and thus longest warranty on all components,
- highest light efficiency and energy savings,
- no maintenance costs,
- the insensitivity to moisture and vibrations in difficult circumstances, high mechanical resistance,
- lifetime independent from the number of On/Off switches,
- immediate start,
- clean light with no infrared and ultraviolet components,
- environmental friendly view: no mercury, lead, heavy metals are present.

	FLUO TP	VTFE	VTNa	MH	LED beLine®
Lifespan	8.000 - 20.000 hours	12.000 hours	up to 20.000 hours	up to 20.000 hours	up to 100.000 hours
Light efficiency	up to 80 lm/W	up to 52 lm/W	up to 85 lm/W	up to 80 lm/W	***up to 105 lm/W
On/Off Sensitivity	low	high	high	high	insensible
Vibration Sensitivity	high	high	high	high	insensible
Interval On / Off / On	10 seconds	15 minutes	15 minutes	15 minutes	1 second
Colour of lightness	from 3000K to 6500K	from 3400K to 4000K	2000K	4500K	4500K
CRI**	> 80	40	20	50	> 75
Regulation interval	0 – 100 %	No regulation	0 – 30 %	0 – 30 %	0 – 100 %
Impact of regulation on lifespan	affects	No regulation	affects	affects	does not affect

*Fluo T5: fluorescent lights; VTFE: mercury lights; VTNa: sodium vapour lights; MH: metal halogen lights;

**CRI: Colour rendering index

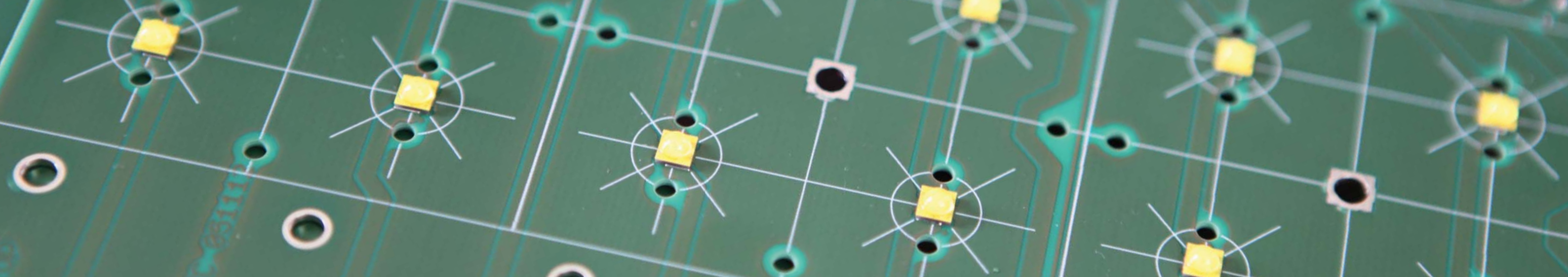
***105lm/watt efficiency of the lamp beLine® (ICREE led kamps have an efficiency of 157lm/watt)

Warranty period

beLine® is the leading product in the LED lighting manufacture. SES Lighting assures warranty on all components in the period of minimal 5 years after implementation and place in service. Clients can also extend the warranty period on maximal 10 years.

Substitutability and availability of components

One of the advantages of beLine® technology in comparison to other competitive technologies is also intelligent industry design that enables quick and easy substitution of inoperative or damaged parts. Individual parts of lighting installations are quickly and easily substitutable. Client is under no circumstances left without the additional component as the warranty assures delivery of replacement lamp in no more than 3 days since the notification about non-function or damage.



The Coherence of beLine® Technology

Labour legislation defines different standards of workplace lighting, depending on their complexity, type of activity and exposure of employees.

Our projects improve the lighting of working premises, thus contributing to the employees' health, well-being and nevertheless business success.

Considerable improvement of lighting in industry halls

- to improve our clients' workplace lighting to standard quality,
- we assure the improvement of workplace lighting without reducing the energy efficiency and energy savings,
- we assure optimal colour of workplace lighting with proper identification of product colours,
- we indirectly assure better conditions for wellbeing, health and great job performance of the employees.

Minimal prescribed lighting of workplaces



The importance of sufficient workplace lighting:

- in normal conditions, human sight needs approximately 25 % energy of the whole nervous system,
- in reduced visibility conditions, energy use increases and tiredness occurs earlier,
- in reduced lighting conditions, number of mistakes increases, depending on difficulty of a task,
- research indicates that reduced workplace lighting causes more work accidents. 2/3 of work accidents occur at lighting, lower than 500 lx. Among these, 1/3 occurs at lighting lower than legally prescribed minimal 200 lx.

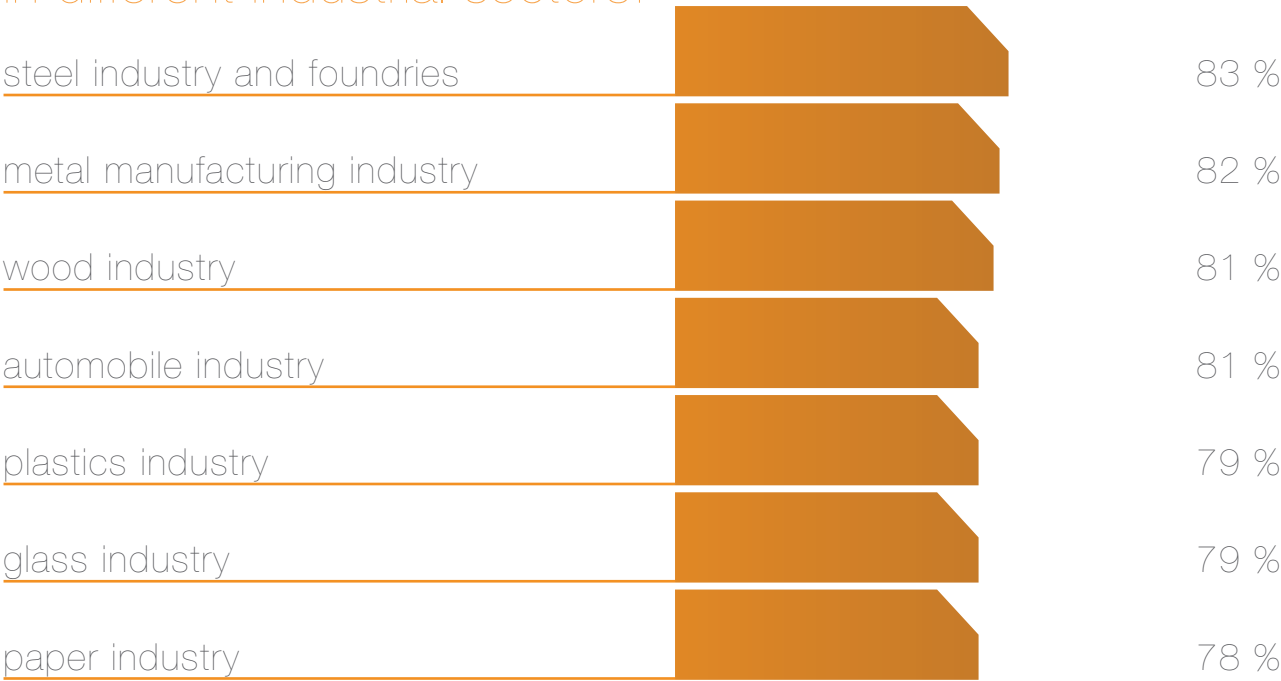


The Dynamics of beLine® Technology

beLine® technology is an ideal solution to lighting in industrial halls and storage facilities higher than 4 m. This technology reaches its best results in:

- dusty workplaces with lower visibility,
- higher places that measure from 4 up to 35 m in height,
- works in places with industrial elevators for carrying the material that generate heavy vibration,
- places with operational phase of at least 10 hours per day.

Approximate energy savings in different industrial sectors:



Storage facilities: 78 % + 8 % savings

beLine® technology assures incredibly high energy savings in storage facilities.

Lighting regimes of lamp illumination in the time of employees' absence represent extra energy savings that can also exceed 85 % of energy.



The Sustainability of beLine® Technology

beLine® technology is developed in close contact with nature and in accordance with the principles of sustainable development

- main aim of beLine® technology is to have as little impact on the environment as possible,
- with constant development of lighting installation we reduce the greenhouse gas emissions, so far as 90 %,
- we use durable and environment friendly materials and technologies only, all components are 100% recyclable.

Sustainability is a very important issue for every company, not only to minimize the environmental impact, but also to comply with current legislation, reduce energy costs and improve their eco-friendly credentials.

The upgrade of existing lighting installations is a quick way to reduce the environmental impact without compromising productivity

Visione del beLine®

Year 2012 – we saved	800 ton CO ₂ / year
Year 2013 – we will save	3.800 ton CO ₂ / year
Year 2014 – we will save	11.300 ton CO ₂ / year
Year 2015 – we will save	28.300 ton CO ₂ / year
Year 2016 – we will save	50.800 ton CO ₂ / year

Five-year Environmental Vision of beLine® Technology

With its know-how and technology, SES Lighting wishes to contribute to the global reduction of CO₂ emissions. Environmental vision till year 2016 predicts

the reduction of enormous 50,800 tonnes of CO₂ emissions on yearly basis, which corresponds to yearly produced emissions of 23,000 cars or yearly produced emissions in a city with 40,000 inhabitants.

Did you know that the first organized initiative for reducing CO₂ emissions began with a lamp?

This is, of course, logical, as lighting in the economy and households produces enormous CO₂ emissions. This has also been confirmed by the research of International Energy Agency (IEA) that stated the following findings, regarding the lighting efficiency:

- 19 % of global electrical energy is used by lighting. That is more than all hydro and nuclear power plants produce and the same as it is produced from natural gas,
- CO₂ emissions produced by lighting amount to 70 % of the global motor vehicles CO₂ emissions and three times more than emissions produced in aeronautical sector.



The Harmony of beLine® Technology

The investment into lighting system renovation or replacement is on the first hand technical solution and, on the other hand, financial, environmental and organizational solution. SES Lighting provides clients with support - from the beginning of the investment until its complete realization. We reach our goals by following these pre-defined steps:

- appointment information and expressed interest in the project LED,
- consultation with one of our consultants and acquirement of basic data from a client: floor plans of the buildings, the last electricity bill, operating time and required amount of lighting,
- based on obtained information and initial preparations, the inventory check of the halls is made,
- preparation of the project and business proposal,
- any alterations are made and lighting necessities are adjusted,
- study of technical and economical feasibility,
- loan and possible grants,
- presentation of the lighting project and a business plan,
- approval of the project and the proposal by the client,
- realization of the project LED.

Approximate results of beLine® technology

electricity savings	reduced by 80 %
CO ₂ emissions	reduced by 90 %
ROI	in less than 3 years
workplace lighting	double improved (by 100 %)
warranty	5 - 10 years
maintenance	€ 0.00 (without maintenance costs)

Our goal is to work with clients to create new lighting solutions that can add value to the business. We offer access to the latest technology and a dedicated team of experts can help you turn your ideas into reality. The development supports the definition of

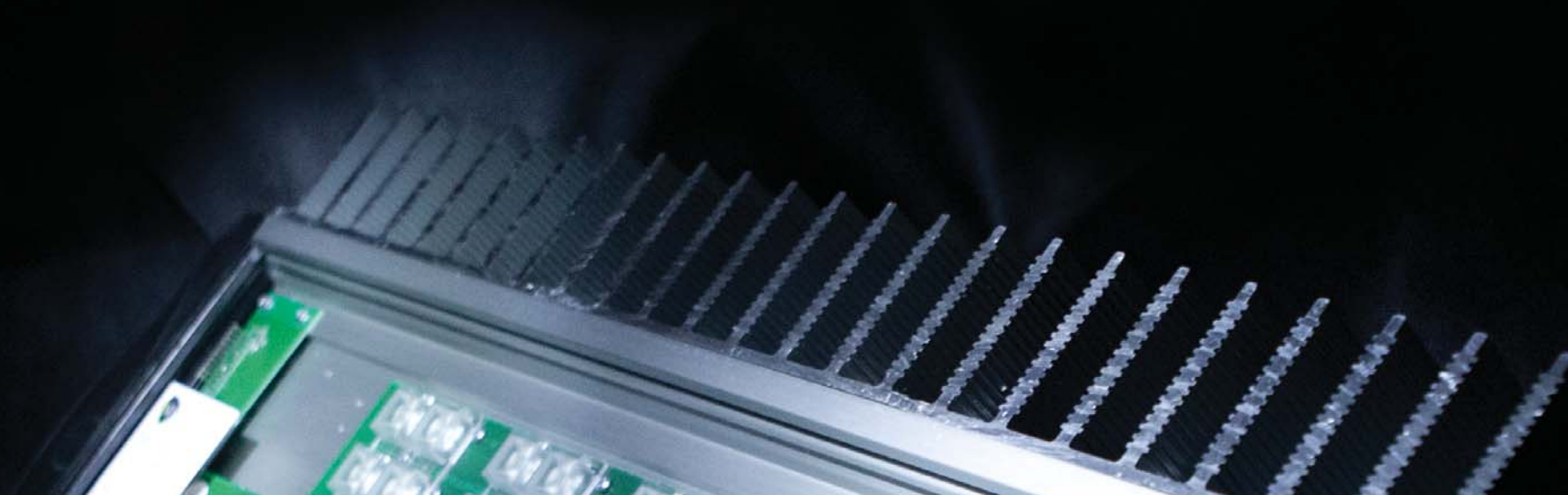
new ideas that enable new levels of sustainability and energy savings for industry and new models for the specific lighting needs. Thanks to our joint efforts, we can solve problems and realize solutions that could change the future of lighting for the industry. The incredible results of beLine® technology were:

- made by following these goals for development:
- light that consumes little power and makes (gives) a lot,
- light that reacts to changes,
- light that favours working performance and the state of well-being at workplace, light that works many years with safety and reliability.

Repaying the investment from the energy savings

One of the biggest business opportunities for large and small companies is in fact the consumption of light that weights a substantial part of the company's outputs. The beLine® technology is able to provide a very interesting saving solution. Our clients can repay the investment costs of the operation from the savings made of beLine® technology. The incredible results of beLine® technology are possible thanks to the following objectives:

- improve energy efficiency,
- reduce CO2 emissions,
- improve the quality of illumination for safer production process,
- the amortization period of the projects is up to 5 years,
- the warranty period is from 5 to10 years.

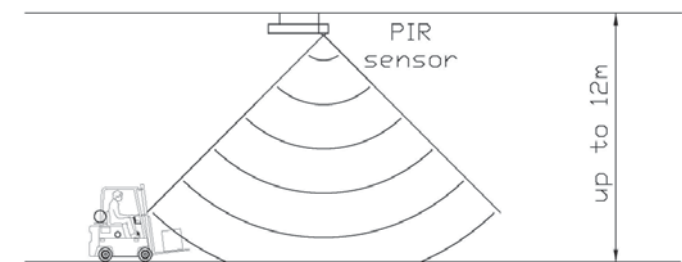


beLine® heavy industry LED lamp

The fast developing LED technology in the 21st century allowed us to develop a new type of heavy industry LED lamp beLine®. The lamp is designed to sustain heavy and harsh conditions that are usual for a heavy industry. We use only the best materials to achieve maximum results and satisfy our client needs. We developed our own LED driver on the latest half-switching technology with no ferrite elements and with dry capacitors to achieve the long life and high lighting efficiency of beLine® lamp.

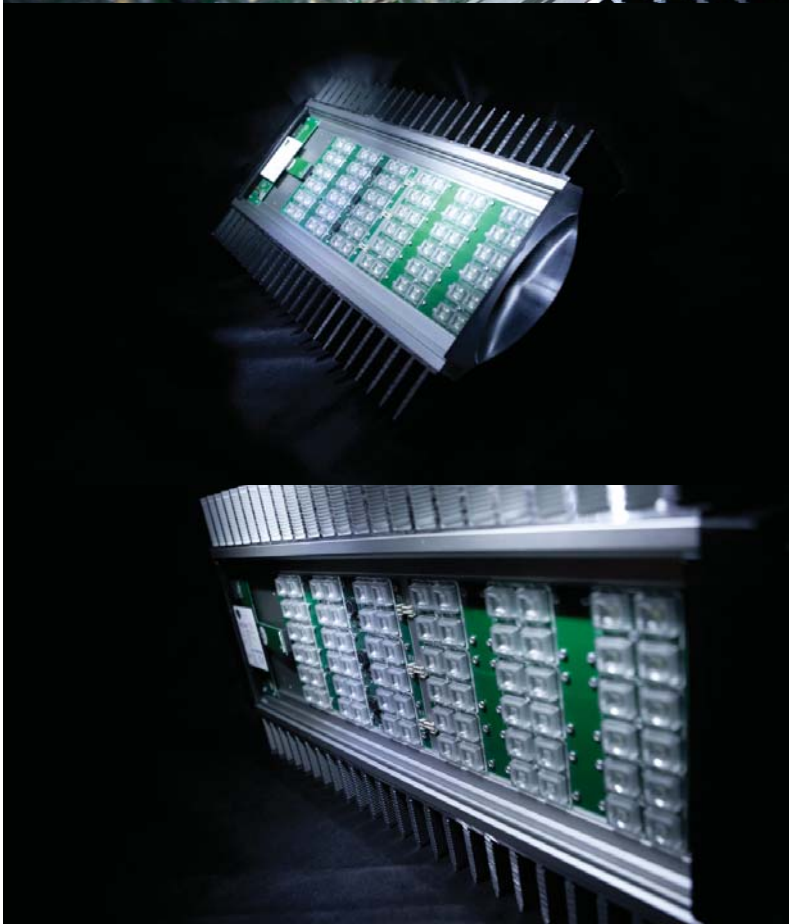
PIR presence sensor

We developed especially for the warehouses the ILCS system that is equipped with a PIR presence sensor in each lamp and allows a total automatization of beLine® lamps. The lamp automatically adjusts the lighting level depending on the presence of the staff in the range of lamp or not.

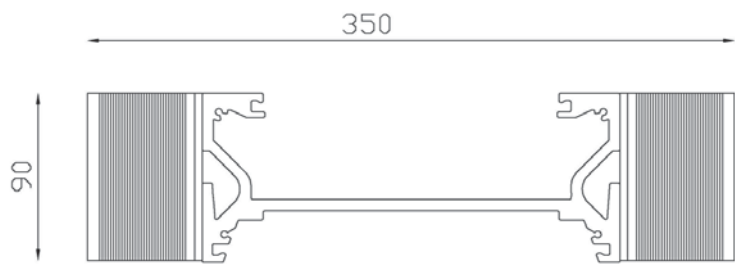


Technical characteristics

LEDs	72 pcs CREE
Consumption:	130 W/170 W
Luminous flux:	13.650 lm/16.400 lm
Optics:	25°, 50°, 65°, 115°
Voltage:	180 – 260V AC, 50Hz
Colour rendering index:	RA > 75
Colour temperature:	4500 K
Ambient temperature:	-30°C to +70°C
Life span:	up to 100.000 hrs
IP rating:	IP 64
Warranty:	5-10 years

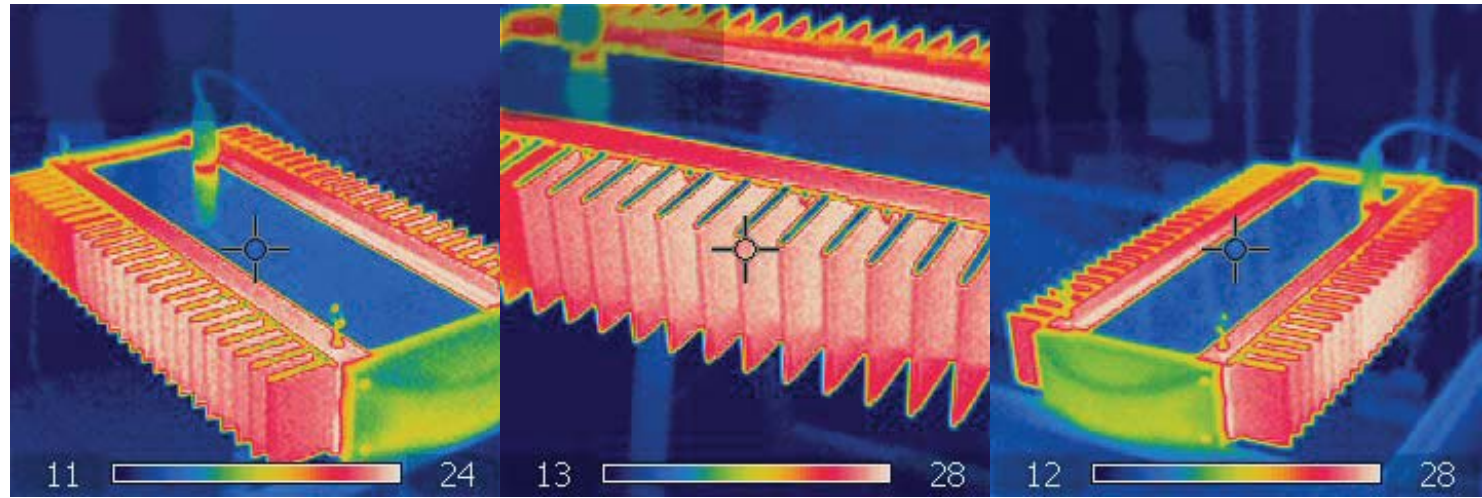


beLine® heavy industry LED lamp



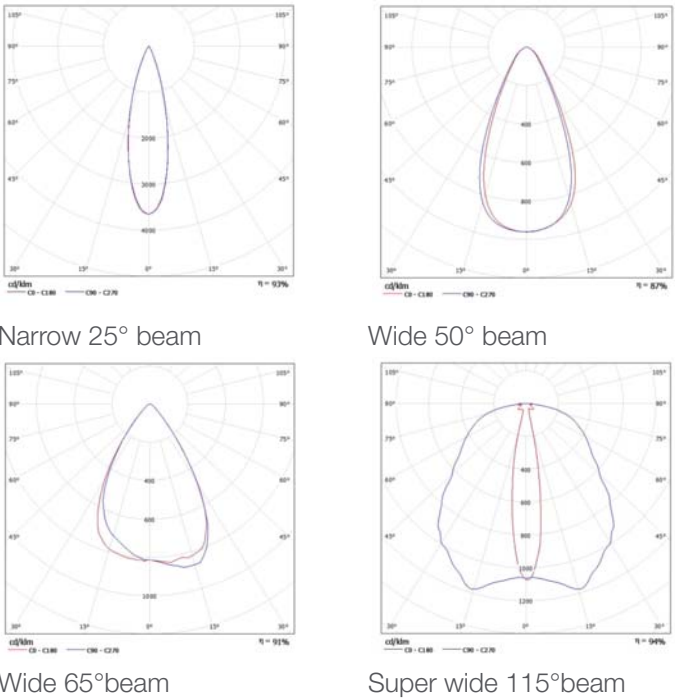
Length: 540/740 mm Weight: 8,2/13,5 kg

The design of a lamp with vertical fins protects the lamp from the dust accumulation and dissipates the heat away from the diodes.



Mechanical data

Housing material:	99% pure aluminium
Optics material:	PMMA
Cover Material:	tempered glass
Suspension:	hanging wire kit



Optics for every need

beLine® lamps are equipped with different secondary optics depending on the needs. For low halls optics with 65° or 115° angle is used, for higher halls that reach up to 22 meters optics with 25° is used.

Certificates:

LVD EMC **CE** **RoHS**



Type project: retail store and storage facilities



Reference project: Tuš Holding Ltd

Tuš Holding is corporate group, consisting of Engrotuš, Tuš Real Estates and Tušmobil. Its main occupation - commerce - is being complemented by different sectors: amusement, recreation, catering, real estate sector and telecommunications. Besides in Slovenia, the chain is also present in Bosnia and Herzegovina and Macedonia.

Business model:

- implementation of business model with energy saving guarantee,
- already in the first month, the client reduced the energy costs by 10 %, the investment will be returned in 36 months,
- for the investment, we obtained non-refundable funds.

Lighting regime

With help of innovative remote controlled system ILCS, the following lighting regime was implemented:

Installation height:	5-11 m
Total area:	24 h ours/ 310 days
Operating period:	improved by 80 %
New lighting:	0,18 €/kWh
Energy price:	3 years
Amortization:	82%
Electricity savings:	416.313 kWh 82%
Maintenance costs:	€ 0,00

- 30%-illumination in empty storage facility (35 W power),
- 100%-illumination in the presence of employees, forklift trucks and other machines (120 W power),

With the use of ILCS system and PIR sensor integrated into the lamp, company will save more than 40.000 € per year.

With PIR sensors integrated in beLine® the following lighting regimes were made:



30% illumination in empty storage facility (35 W power).



100% illumination in the presence of employees, forklifts and other machinery (120 W power).



Type project: metal manufacturing industry



Reference project:
Kovintrade Metal Ltd

Kovintrade Metal Ltd deals with sheet-metal scrapping and sale. It operates in higher industry halls within the major industry complex. Approximately 80 % of yearly income is being made on the European markets.



Installation height:	9 m
Total area:	1.800 sqm
Operating period:	24 hours / 365 days
New lighting:	improved by 150 %
Energy price:	0,090 €/kWh
Amortization:	1,27 years
Electricity savings:	115,520 kWh 82 %
Maintenance costs:	€ 0,00

Changes in fixtures positions



Lighting fixtures were partially moved in accordance with the project requirements. We reduced the number of fixtures from initial 39 (500 W VTF) to final 32 lamps (120 W LED beLine®).

125W of beLine® power was enough to achieve 250lux on 9m height. A total of 32 that were used on 2.500 m2.



Type project: wood industry

fantonigroup

Reference project:
Lesonit Ltd (Fantoni Spa)

Lesonit was established in 1944 and is one of the leading European companies in the field of dry technology based chipboard production. In 2000, the Lesonit was taken over by the Italian corporation Fantoni Spa that was established 1882 and deals with wood processing as well. One of the main corporation's business principles remains modern and environment friendly technology.

Additional optimisation:

lamp rationalization and remote control system.

Lighting rationalisation was possible by implementing two additional arrangements:

- reduction from initial 200 x 250-W HQI lamps to 120 x 120-W LED beLine® lamps with ILCS system,
- beLine® lighting assures 100%-illumination in the presence of the employees or fork-lift trucks, whereas the illumination is reduced to 30 % in the event of empty workplace (total obscuration in the corners of the workplace). Annual savings reach €46.000.

Installation height	6-11 m
Total area:	7.600 sqm
Operating period:	24 hours / 365 days
New lighting:	improved by 50 %
Energy price:	0,08€/kWh
Amortization:	< 2 years
Electricity costs:	547,821 MWh
Electricity costs:	85 %
Maintenance costs	€ 0,00



Lighting before the investment (80 – 100 lux),



Lighting after the investment (130 – 180 lux).

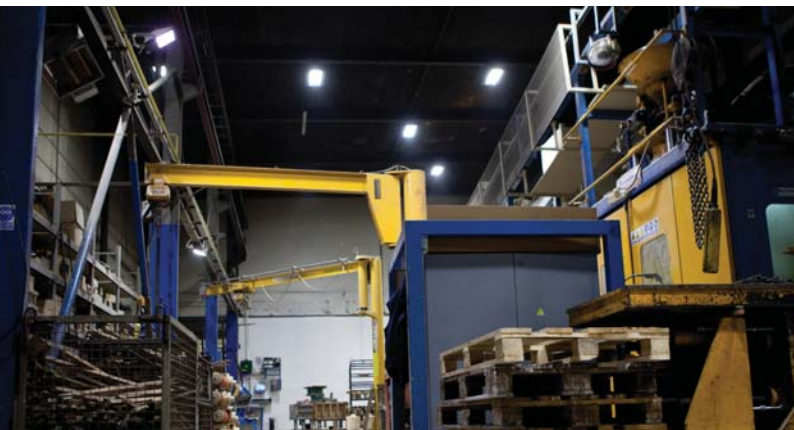


Type project: the foundry



Reference project:
Kovis Foundry Ltd

Company's main occupation consists of producing high-quality metal industry products. Kovis is a specialist for railway industry products, especially for the so called rolling stock. Brake disks, bearing boxes and other rolling stock parts are produced of grey cast iron and nodular graphite iron, casted in the Kovis foundry.



Increased brightness of the quality control room - 450 lux.

Installation height:	5-11 m
Total area:	9.050 sqm
Operating period:	24 hours / 310 days
New lighting:	improved by 250 %
Energy price:	0,08€/kWh
Amortization:	< 3 years
Electricity savings:	374,482 MWh
Electricity savings:	78 %
Maintenance costs:	€ 0,00



Lighting before the investment (50 - 80lux),



Lighting after the investment (120 - 180lux).



Type project: steel industry/turbine manufacture



Reference project:
Litostroj Steel Group Ltd
(Semco Factory).

The company's main occupation consists of producing industrial engines and turbines. Semco Factory is a part of the steel corporation where operating takes place under demanding conditions with frequent vibrations, dust and bad visibility.

Business model

- In 3 production halls of the factory we replaced 107 mercury lamps with a total consumption of 460W with beLine® lamps of 120W.
- The replacement took only 2 days (on weekend) because we replaced exactly one old lamp with a new beLine® lamp. The total reduction of electricity costs for the company is more than 25.000 € per year.

Installation height:	9-11 m
Total area:	4.100 sqm
Operating period:	24 hours / 365 days
New lighting:	improved by 200 %
Energy price:	0,08€/kWh
Amortization:	< 2,5 years
Electricity savings:	310,482 kWh
Electricity savings:	74 %
Maintenance costs:	€ 0,00



Increased lighting from 150lux to 350lux



„Big results require big ambitions.“
Heraklit