

outsmart building technologies



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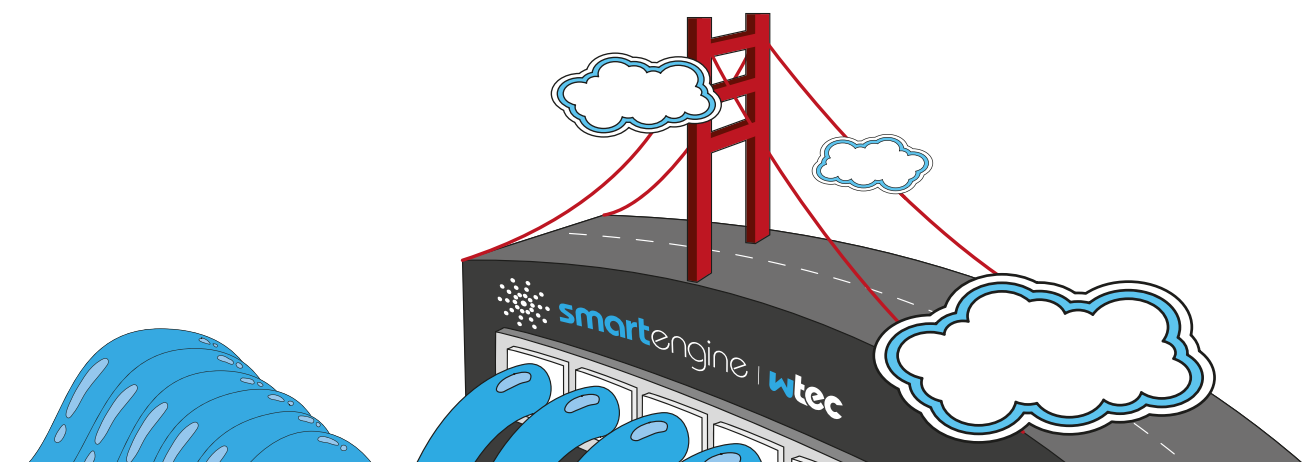
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technology

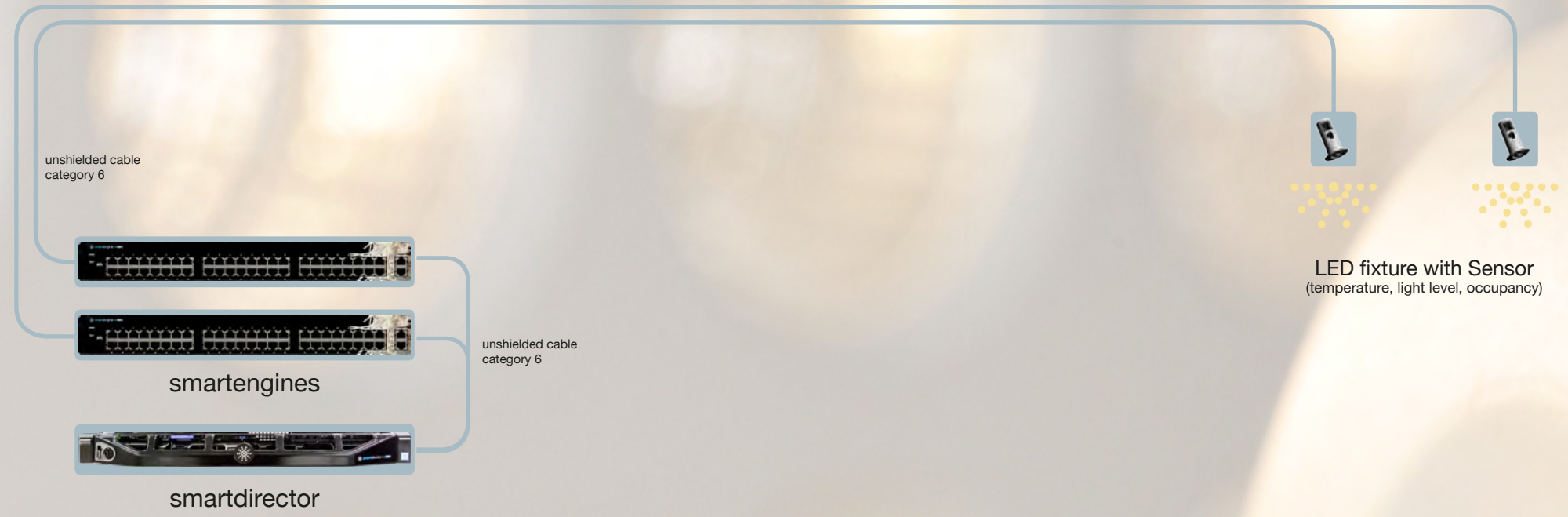
smartengine is based upon a patented sensor communication scheme to supply LED lights with safe low voltage in an intelligent way (Internet of Things). Plug&play using just one data cable, unlimited multivendor capability and no interruptions.

Our technology replaces conventional power infrastructures and complex bus systems for lighting. smartengine sensors on each luminaire measure Temperature, Brightness, and Presence simultaneously – and make this data available in real time. The smartdirector provides scalability as well as intuitive user-friendliness.

Networked sensors installed throughout the building allow a live overview of occupancy and use in all facilities. Precise savings and utilization strategies can be created and implemented quickly. Besides their initial purpose, ie intelligent lighting, the data can also be used by many other Building Management Systems (BMS).



34 watt per channel



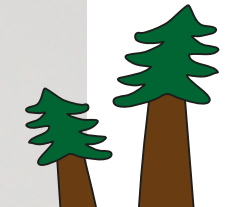
network powered lighting

The patented smartengine technology consists of only a few components:

- **smartengine:** the central unit connects up to 48 sensors and supplies connected LED luminaires with regulated DC voltage.
- **sensors:** monitor the room intelligently (IoT) and transmit sensory data to the smartengine in real time.
- **smartdirector:** manages up to 40 smartengines or 2,000 sensors. Interfaces for BACnet and BMS are provided via an integrated Open API.
- **software:** holistic management of the system (web-based) and various apps for control, visualization and evaluation via smart devices.

Production sites are located in Forest, VA and Bratislava, SK. Continuous further development of hardware and software takes place in San Jose, CA and Bad Homburg, DE.

smartengine sustainably combines leading-edge functionality with great benefits to people and the environment.





technology | hardware | functionality

open building technology

smartengine allows flexible and safe connectivity with existing building management systems (BMS) and other technologies.

- smartengine becomes the central component for a universal, structured network for all IP-based devices (IoT).
- The Open Platform (API) allows connections to other building control systems and supports Service Oriented Architecture (SOA).
- smartengine provides an integrated HVAC interface (eg BACnet).
- smartengine can centralise Monitoring within buildings and for multiple buildings.
- smartengine software is under continual enhancement and allows docking individual self-developed Apps.
- Unlimited multivendor capability guarantees flexible freedom in selection of LED luminaires.
- Open but secure software is open but secured by encryption.
- Freedom to connect hardware and software systems via standardized network protocols and trusted Security mechanisms (authentication, authorization, encryption).



technology | software | sensor system

upvalue impact

smartengine offers more than profitable savings in terms of electricity and operating costs. It makes rooms and buildings intelligent and agile. The Luminaires create a fine-meshed network of sensors, which supply real time data on Brightness, Temperature and Presence. This data provides continuous live climate and occupancy status of a facility, ideal for improving operations in terms of efficiency and safety.

Leading space utilization concepts can be implemented and flexibly adapted to meet specific needs. Fine-mesh sensory values become valid and representative values and pin-point actual states and requirements, which can be used by HVAC systems to precisely control heating, cooling or fresh air supply.

smartengine can be connected with multiple technologies to meet synergetic requirements for versatile applications and tasks - now and tomorrow. Scalable, transparent and future ready.



technology | software | usability

bashing ignorance

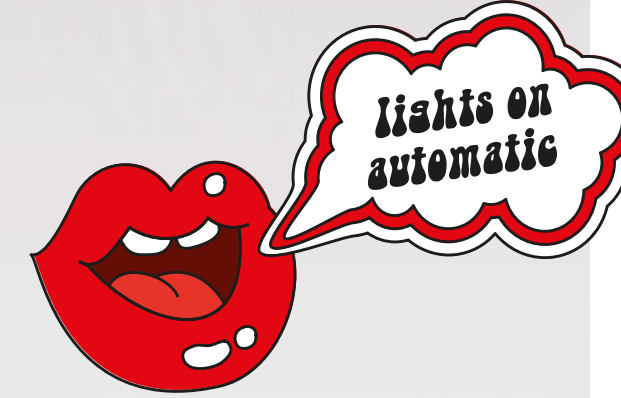
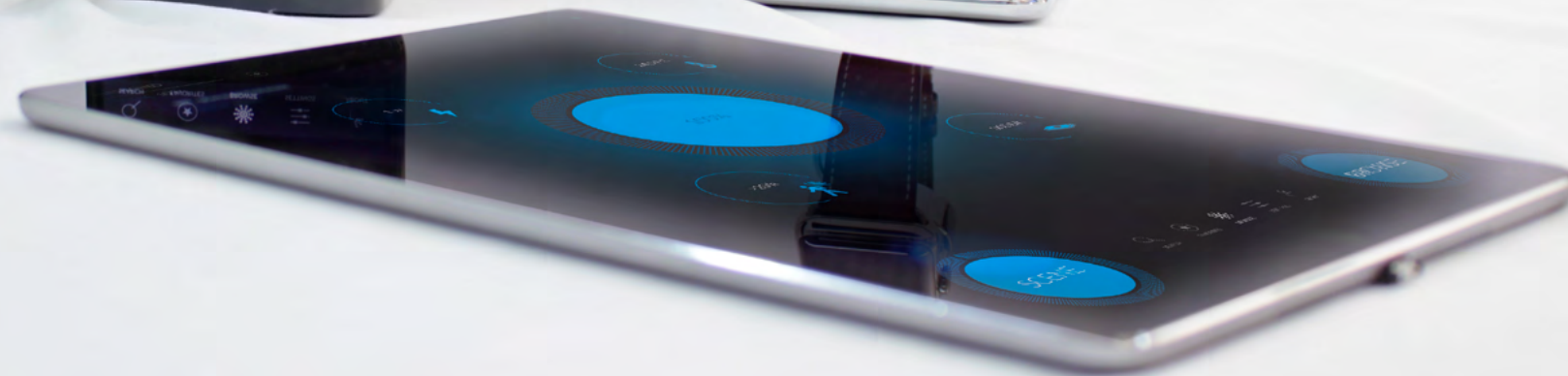
smartengine offers a look into the future.

The patented technology meets the upcoming demands of an efficient and economic use of a facility, taking into account Work, People and Environment.

Complicated, self-contained technologies are replaced by an open, future-ready and scalable platform. smartengine is forward-looking and offers investment security while substantially lowering operating expenses.

System setup, control and management can be accessed locally, centrally or globally with maximum security via a user-friendly web interface or smart iOS Apps with intuitive usability. The secure but open platform (API) allows customer-specific software solutions or implementation of proprietary software.

smartengine offers connectivity to or integration with future technologies and sets you free from unnecessary complex, vendor-dependent systems.



dive live

Simple light switches are increasingly being replaced by a variety of hardware and software solutions. Intuitive applications offer ease of use. smartengine provides unlimited options to connect hardware and software.

- rSPHERE is an intuitive suite of iOS Apps for individual lighting control via multiple devices.
- Voice control for smartengine now available with Amazon „Echo“ and Apple „Siri“.
- Desk- and Office-sharing models can be realized by visualizing occupied and free workstations on floor plans or in heatmaps.
- Location-based services and positioning can be integrated with near field communication (NFC) devices which can be visualised with rSPHERE.

Frequently used integrations feature:

- Search, book and manage meeting rooms
- Way finding (free workstations), Emergency assistance (follow me)
- Live security monitoring
- Retail consumer analysis and optimization
- Human Centric Lighting (HCL) promoting well-being and performance



technology | software | components

pure focus

A few specially developed components are all it takes to run a smartengine system efficiently:

- smartengine provides 48 sensor ports and supplies LED lights with up to 34 Watt per channel.
- smartdirector controls up to 40 smartengines, enhances the system's functions and is the interface for hardware and software integrations.
- smartsensor in each individual luminaire measures Presence, Brightness and Temperature.
- smartgateway (2-channel) is used as interface to connect HCL-luminaires.
- smartcontroller is a wall switch for immediate access to individualized scene selection.
- pepper patch lead is an aluminium-free, robust network patch cable, which guarantees reliable and secure connection to the luminaire.

technology

- Fully automated system
- 48 ports at 34W per engine 18VDC–48VDC
- Service-oriented architecture (SOA)
- Dimming of luminaires in voltage
- Seamless, flicker-free dimming
- One data cable for electricity and data (up to 100m)
- Protection class III Safety Extra Low Voltage, no power cables
- Compliant with DIN, EN and VDE
- Quickstart of the system in under 15 seconds
- Application programming interface (API)
- BACnet Interface (BMS)
- IP-based
- Maximum Security (SSL)
- Drag & Drop function of elements
- Real-time data for temperature, brightness and presence
- HCL-capable
- Independent system to LED lamps manufactures

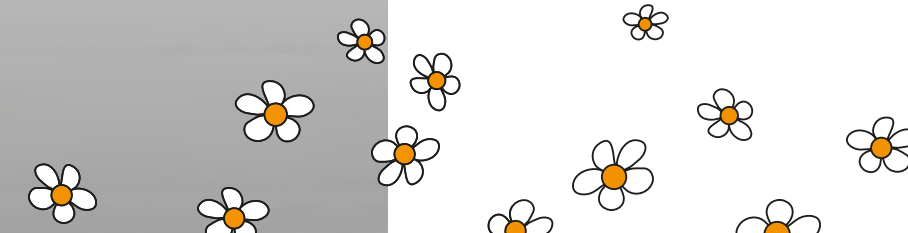
good

- Saving electricity and operating costs up to 90%
- Simple and flexible operation
- Building Intelligence (IoT)
- Real-time data (analysis and evaluation)
- Live security monitoring
- Increase in value of the property (LEED, BREEAM, DGNB)
- Increase of life-time of LED lights up to 100,000 hours
- Voice control is possible
- Unlimited variety of applications through smart apps
- Operational and failure safety

value

- Avoidance of energy dissipation
- Protection of environment and resources
- Reduction of CO₂ emissions
- Contribution to climate protection
- Networking with other technologies (IoT)
- Future-oriented, directional technology
- Improvement in life and work quality
- Increase of well-being (HCL)

jelly beans





good



The lighting technology of the future will meet people's individual needs.

By avoiding wasting energy it will spare our natural resources and the environment.

As a smart component of the Internet of Things (IoT) it will connect with other technologies and communicate with the user.

The future of lighting technology is IT-based.

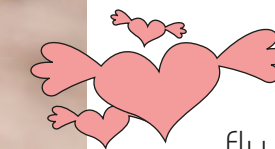


good | energy savings

things 2 hear

Reducing energy costs for lighting by up to 90%.
The award winning smartengine technology is intelligent and provides unmatched efficiency. smartengine provides each user with exactly as much light as needed.

Reducing operating costs for lighting by up to 90%.
The sensor-based system uses safe extra-low voltage (SELV) to remove safety hazards, protect LED lights and prolong their lifetime to up to 100,000 hours. With its open interface smartengine provides fine-meshed data for all building management systems.



fly sein





good | economy

game changing

Easy to plan, and unequalled flexible: smartengine reaches amazing results in intelligence, reliability and energy efficiency. smartengine replaces complex, separate and unsafe bus and power infrastructures for lighting with standardized and simple IT infrastructure.

By providing detailed sensor information for building management systems (BMS) smartengine significantly reduces the investment costs in technical building equipment. Furthermore smartengine achieves an excellent return on investment (ROI) by its energy efficiency alone.

- smartengine lowers the average consumption for lighting to 1-2 Watt per square meter.
- smartengine helps to achieve certifications (LEED, BREEAM, DGNB) for ecologically efficient buildings (green buildings).
- smartengine sets new standards in building management technology and is compliant with the state-of-the-art recognized technology standards (EN, DIN, VDE).
- smartengine provides future-proof sustainability, reliability and a higher in real estate asset value.





good | occupancy

individuality

smartengine creates freedom to use and flexibly control the widest possible range of LED luminaires and manufacturers. smartengine amazes with unmatched flexibility, individual control and user friendliness.

Using the software, sensors and lights in a room can be reached individually, grouped or re-assigned to different rooms - without any physical intervention – simply by drag & drop.

The system regulates light levels under consideration of daylight – automatically, continuously and absolutely flicker-free.

The fine-meshed sensor network ensures a well-balanced direct and indirect light ambience with unheard of energy efficiency.



good | synergies

unique unity

Unique: Temperature, Brightness and Presence are captured at each sensor location, recorded and made available centrally in real-time. This representative and usable data on room and building use allows targeted and accurate utilization and savings strategies. Facilities can now be operated more efficiently.

Central power supply for all of the LED fixtures is combined with interference-free transmission of sensor data via only one unshielded Category 6 data cable. 34Watt are transported over a length of up to 100m with almost no loss in a bandwidth of 18-48Volt for each LED luminaire.

smartengine efficiency, flexibility and functionality surpasses all available IT-based PoE and PoE+ lighting systems and requires no decentral power cabling.

schmoof

engines
WE
love



good | security

steady secure

smartengine sets new standards in operational safety.

smartengines are ideally installed in IT rooms, the best environments to safely operate electronic components. smartengine uses safety extra low voltage (SELV) protection class III for the power to luminaires. The risks due to short circuits or electrical shocks are eliminated, the risk of fire due to faulty operating devices considerably reduced. The star layout network structure provides simplicity and multiple redundancy:

- Two independent switching power supplies: In the event of a power supply failure, the second power supply takes over the supply with up to 50% of the total output.
- The lights of a room can be distributed to several smartengines.
- The primary circuits are protected separately.
- Connection to UPS or separate power distributions is possible.
- Central messages about status and failures can be sent by SMS or e-mail.
- As sensors don't need an IP address and are protecting from attack.
- After a power failure, smartengine provides the light supply in less than 15 seconds.
- Installation of smartengines is simple, safe and fast.
- When replacing smartengine, the new one adopts the previous configuration within one minute.



cheedo





value

Here at wtec our goal is developing trend setting products while sustainability into practice.

Smart minds in Bad Homburg near Frankfurt, Germany and in Silicon Valley continually work on innovative products and solutions.

Technology, Benefit and Effect build the triangle of our value creation. The latest highlight is smartengine, a unique blend of Light and network Intelligence. Its technology already support multiple leading multinational corporations worldwide.

With maximum effect and little effort smartengine avoids the waste of energy and reduces CO₂ emissions significantly.



value | responsibility

shared evolution

We live and work in the networked world. All our actions have affect our fellow human beings and the environment. Doing something or do not doing it - everything influences the world in which we live in.

We want to share the smartengine technology to positively affect each individual and the entire planet: we improve the quality of work and life while reducing CO₂ emissions. Technologically, the solution is in our hands, not only to fulfil climate targets but surpass them.

A technology visible and available to all.



value | working environment

innately sunlike

Biologically effective and dynamic sunlight is essential for our health and well-being.

The idea of Human Centric Lighting (HCL) is to create a comparable light within rooms. The circadian course is simulated indoors by adjusting the artificial colour temperature to the daylight curve of the sun.

The effect: We feel better, naturally. smartengine is the only system that unites the HCL concept and highest energy efficiency. In rooms, we combine the HCL function with the continuous harvesting of daylight.



efficiently true

In the smallest unit of a German banking network, one of our customers reaches large impact. A pioneering effort which was awarded for excellent sustainable thinking and action. The numbers speak for themselves:

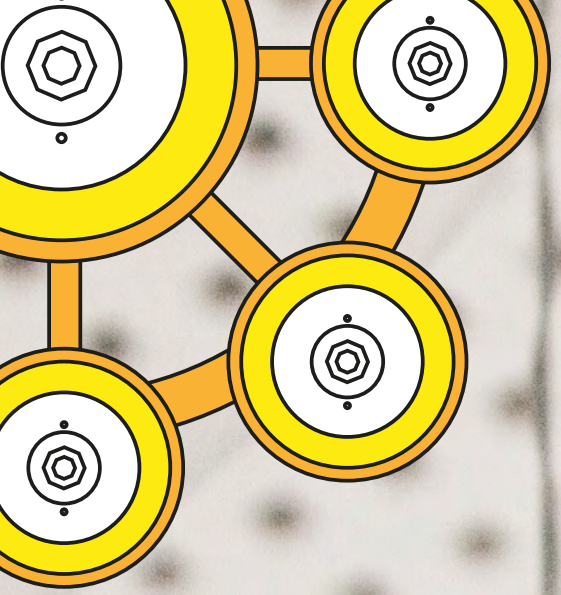
Surface area: 300 sqm
60 kWh energy savings daily
16 MWh energy savings annually

Instead of wasting that energy you could:

- ... drive 138.00 km with an electric car
- ... treat 8,556,000 litres of water for drinking
- ... reduce your CO₂ footprint by 14.4t every year!

„To spare the environment and to save costs. That's the reasons why we are using smartengine in our buildings. At the same time, as a real estate financier, we encourage our customers to go for innovative technologies too. Sensor technology opens up completely new opportunities – we are looking forward to groundbreaking developments.“

– Oliver Klink, Chairman of Management Board, Taunus-Sparkasse –



value | interdependency

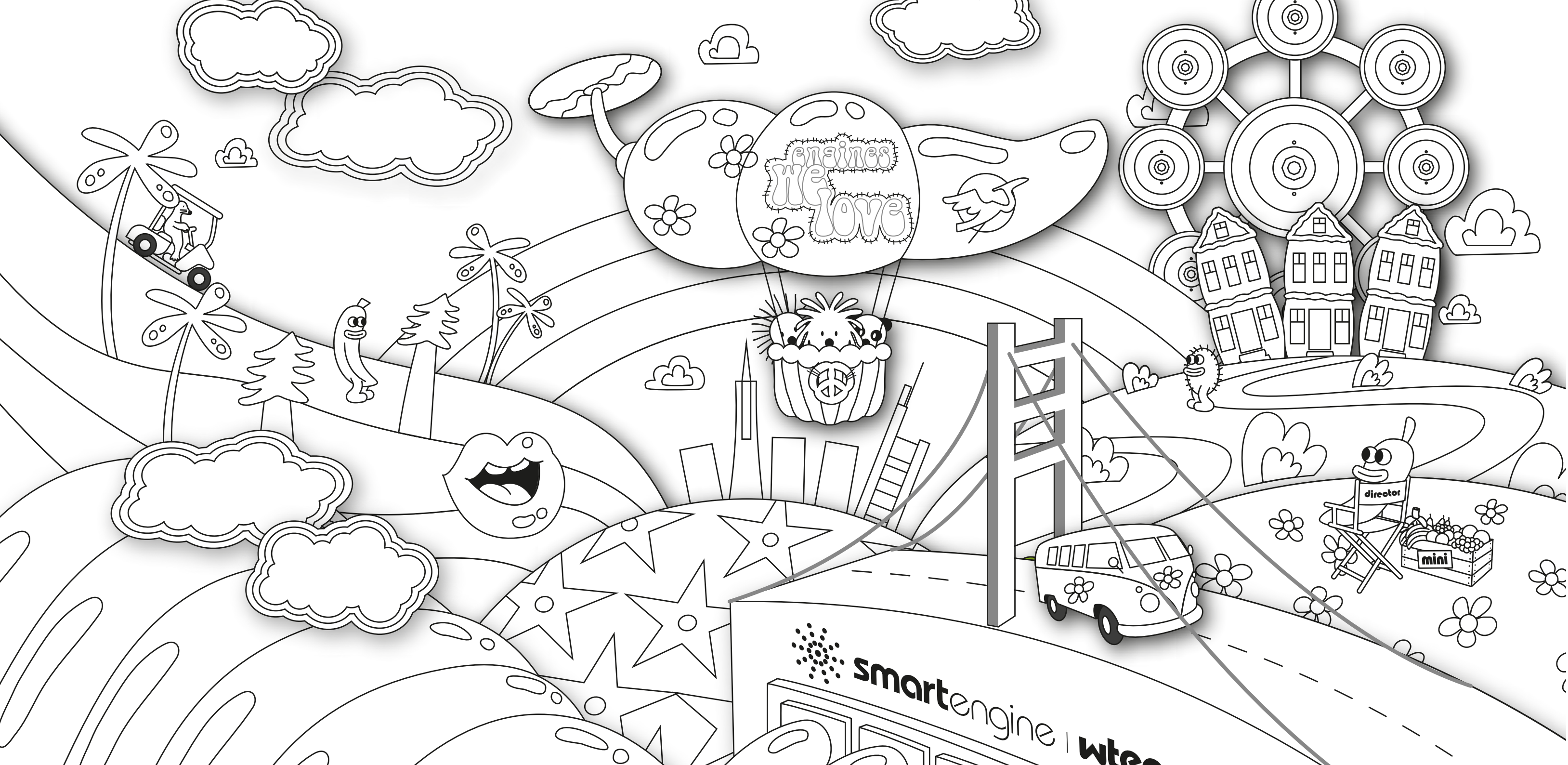
perpetual progressive

By using our sustainable technology, energy saving targets can be achieved lastingly. Natural resources are spared.

Local CO₂ reduction always has a global effect.

To understand climate protection globally means participating.

smartengine works technologically precisely. Its design is scalable and future-proof.



me time

See the world in your colours, paint a picture and send it to planet@wtec.ag

Wait to see what you can affect!



engines we love

wtec AG was born in 1989 from the idea of experiencing technology in usefulness and function, to promote sustainable thinking and to have fun while doing so.

*"Two things drive us here, the love of technology and making customers happy."
Daniel S. Massey, COO*

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 Kalar Lighting
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 for partner recommendations and contacts details.

outsmart building technologies | cases

CASE	Modern Office Campus New Construction Fortune 500 & NASDAQ-100 Global Storage & Data management leader New world-class facility for Developers & most efficient Campus in India
LOCATION & SIZE	Bangalore India 100,000 sqm
HIGHLIGHTS	<p><i>"The idea of this strategic investment in Bangalore is to ensure we build a great home for our people."</i> VP & Managing Director, India</p> <p><i>"This building is extremely sustainable, right from the blocking & stacking of the building. We've set about to maximize daylight penetration and minimize solar heat gain and use free cooling. We have an extremely efficient Lighting system (smartengine) with which we can do all kinds of wonderful things like Data Analytics."</i> Head of Facilities, India</p>
ACHIEVEMENTS	Integration of fine-mesh smartengine Sensor data for room occupancy & fine-grain temperature based air flow valve control (HVAC energy savings > 30%). Use of sensory data for occupancy measurement & optimization (> 15% higher Occupancy level achieved).
INSTALLATION LIGHTING SYSTEM	300 smartengines 10 smartdirectors 11,000 smartsensors
EFFICIENCY	44.4 kW 100,000 sqm
ENERGY SAVINGS	15,379 MWh – yearly 8,566.7 tons less CO ₂ -emission – yearly

CASE	Production & R&D Campus New Construction Leading global chemical science and technology company in healthcare, life science and performance materials Innovation Center as part of global HQ Campus extension
LOCATION & SIZE	Darmstadt Germany 7,300 sqm
HIGHLIGHTS	<p>The Innovation Center links a creative working environment with a culture of openness and exchanges between employees and startups, visionaries and companies from around the world.</p> <p>It is the place where technologies and competencies from various areas converge. Individual elements are molded into ideas and projects, creating future products and services.</p>
ACHIEVEMENTS	Globally the first integration of Human Centric smart Lighting (HCsL) in combination with energy efficient real-time daylight harvesting individual to each luminaire. Sensory & control integration into Campus BMS system.
INSTALLATION LIGHTING SYSTEM	72 smartengines 2 smartdirectors 1,600 smartsensors
EFFICIENCY	13.8 kW 7,300 sqm
ENERGY SAVINGS	181.6 MWh – yearly 92.6 tons less CO ₂ -emission – yearly

CASE	Country Headquarters Retrofit in existing building Largest Swiss insurance company with Global reach Retrofit upgrade in Irish corporate office building as part of global energy efficiency leadership initiative
LOCATION & SIZE	Dublin Ireland 3,345sqm
HIGHLIGHTS	<p><i>"We are proud of the fact that we became a carbon-neutral company."</i></p> <p><i>"It's important to us to ensure that all our corporate real estate and facilities management efforts support our overall Environmental Policy, which includes reducing our energy footprint."</i></p> <p><i>"We anticipated that smartengine would reduce our energy expenses by 70 to 75 percent and we've exceeded that target by an additional 13 to 15 percent."</i></p> <p><i>"On a sunny day, we can achieve up to 90 percent savings by harvesting natural light. smartengine also helped us create a brighter, better and more productive environment for our employees."</i> Head, Corporate Real Estate and Facilities Management, Ireland</p>
INSTALLATION LIGHTING SYSTEM	17 smartengines 1 smartdirector 650 smartsensors
EFFICIENCY	6.5 kW 3,345 sqm
ENERGY SAVINGS	251.0 MWh – yearly 128.0 tons less CO ₂ -emission – yearly

CASE	Production Facility Retrofit in existing building SDAX & Nisax20 listed leading multinational photo development & printing company Lighting upgrade in existing production & printing facility
LOCATION & SIZE	Eschbach Germany 2,275sqm
HIGHLIGHTS	Implementation of intelligent background lighting which flexibly illuminates areas adjacent to areas with occupancy providing even light levels and color quality throughout used areas instead of lighting the entire facility.
ACHIEVEMENTS	Improved production conditions, including better quality control lighting and environmental lighting, whilst reaching substantial cost reductions for lighting power.
INSTALLATION LIGHTING SYSTEM	12 smartengines 1 smartdirector 564 smartsensors
EFFICIENCY	3.8 kW 2,275 sqm
ENERGY SAVINGS	252.0 MWh – yearly 128.5 tons less CO ₂ -emission – yearly

