



# The role of LIGHT in Industry 4.0

Feb. 19, 2018, Munich

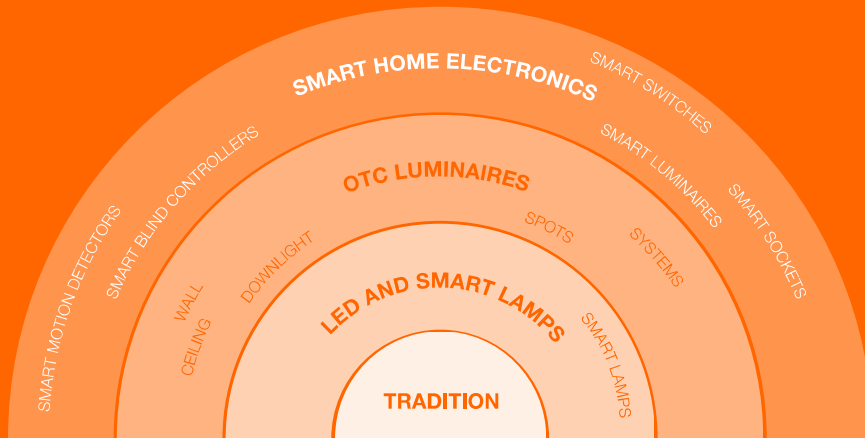




# ABOUT



# What we do



WE KEEP OUR CORE BUSINESS AND  
INVEST IN FUTURE TECHNOLOGIES

# Our company in numbers

ACTIVITIES IN MORE THAN  
**120**  
COUNTRIES

ABOUT  
**9,000**  
EMPLOYEES

WE HAVE PRODUCTION SITES  
**GLOBALLY**  
IN 9 COUNTRIES

AROUND €  
**1,900,000,000**  
REVENUE GENERATED IN FISCAL YEAR 2016

**CORE  
BUSINESS IS  
STILL LAMPS –**

**BUT WITH  
TWO MAJOR  
NEW  
BUSINESS  
AREAS**

## Our product segments

### Traditional lamps



Thermal



CFLi



LPD



HPD

### LED lamps



Classic



Spot



Tube

### New Business: OTC Luminaires (exemplary)

#### Trade



#### Retail



### New Business: Smart home (exemplary)



Smart  
Plug



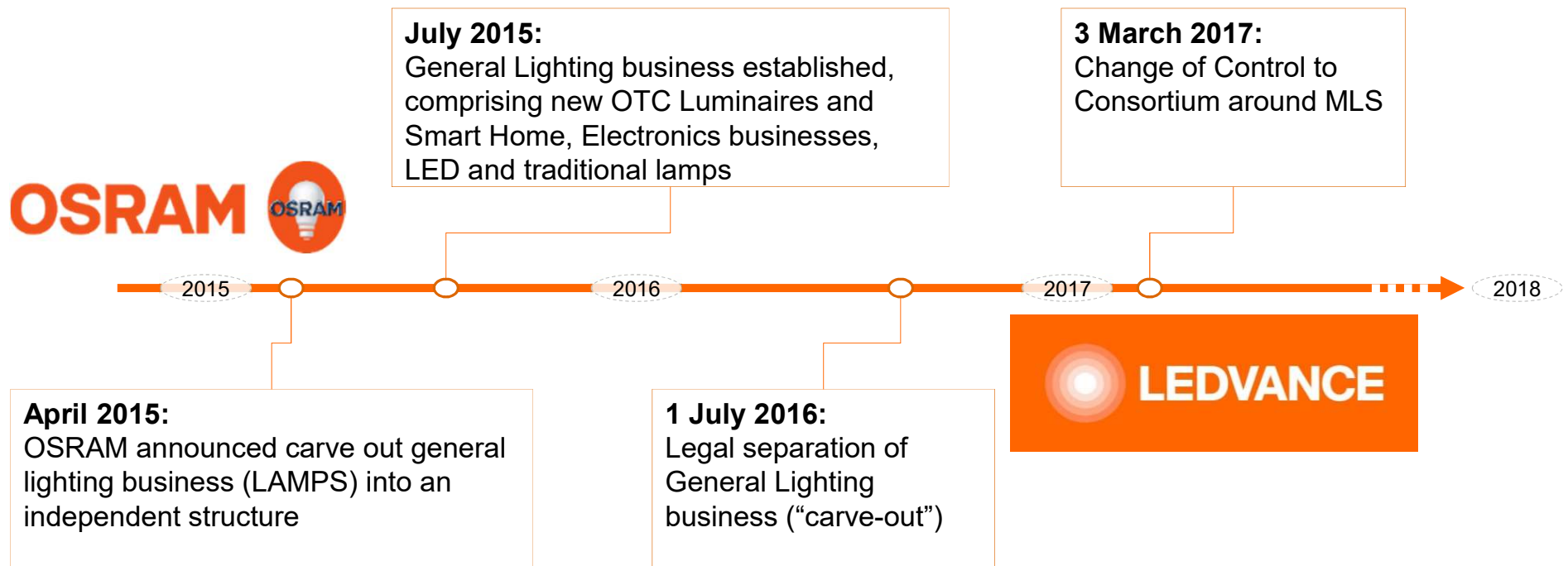
Smart  
Switch



Smart  
gateway



LEDVANCE started as a spin-off from Osram combining the “Lamps” business (traditional and LED) and got acquired by a Chinese consortium





# TOGETHER, WE SHINE BRIGHTER



Global LED Packaging



China LED Displays  
Global X-mas Lighting



Global Halogen Lamps



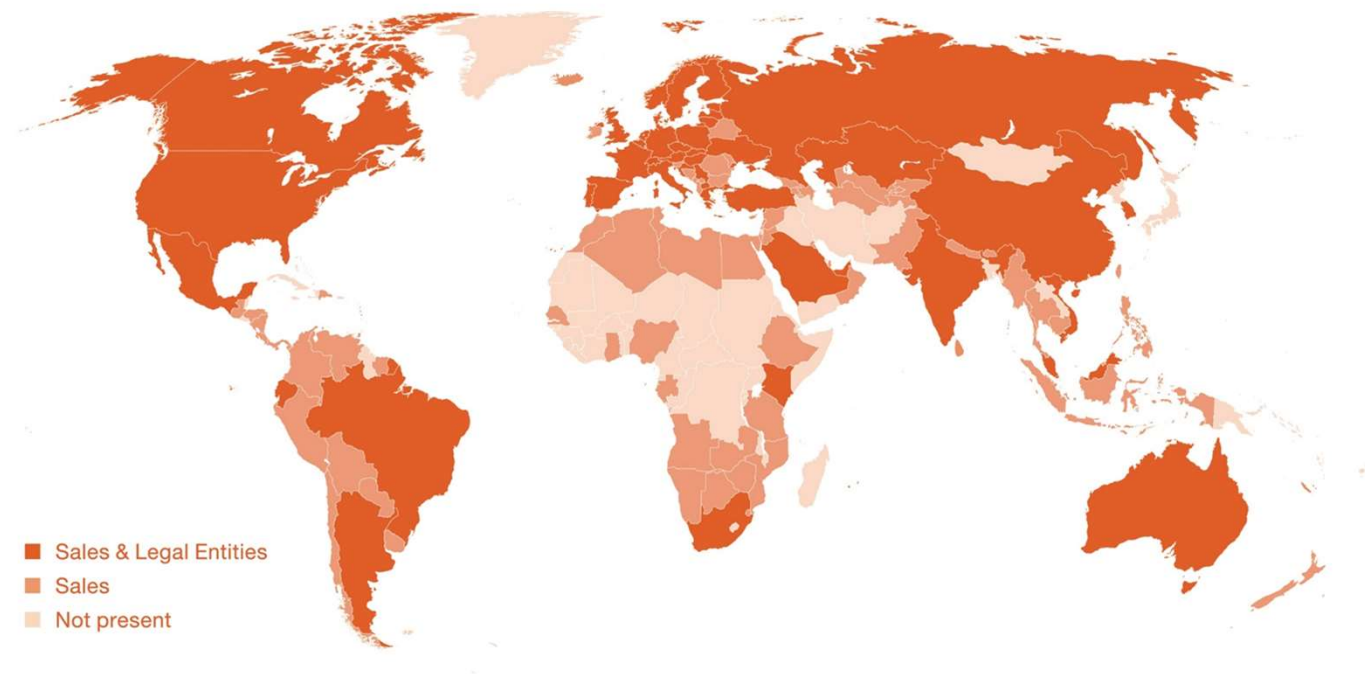
Global LED Lamps

- LEDVANCE to act **independently**, utilizing MLS partnership mainly for LED supply
- LEDVANCE to drive **all international business outside China** going forward



## LEDVANCE – At a glance

Outstanding market access: Active in over 120 countries around the globe



### Market share and position

#### Traditional Lamps



Germany



Globally



In halogen  
lamps



Global  
market share  
(30% in  
halogen  
lamps)

#### LED Lamps



Germany



Globally



Market  
share  
Europe



Market  
share  
Americas

Sources: OSRAM market model, GfK, HIS

1 Split based on Trade and Retail channel, excluding OEM and Other channels as of FY16

2 Customer facing Trade and Retail sales force without customer service as of Oct 2015 3 Including Middle East & Africa



## OUR MISSION

**ADVANCING SOCIETY by  
advancing light**



... through solving fundamental customer problems

1



**Provide highest  
USABILITY  
with our  
products**

2



**Improving  
HUMAN  
HEALTH &  
WELL-BEING**

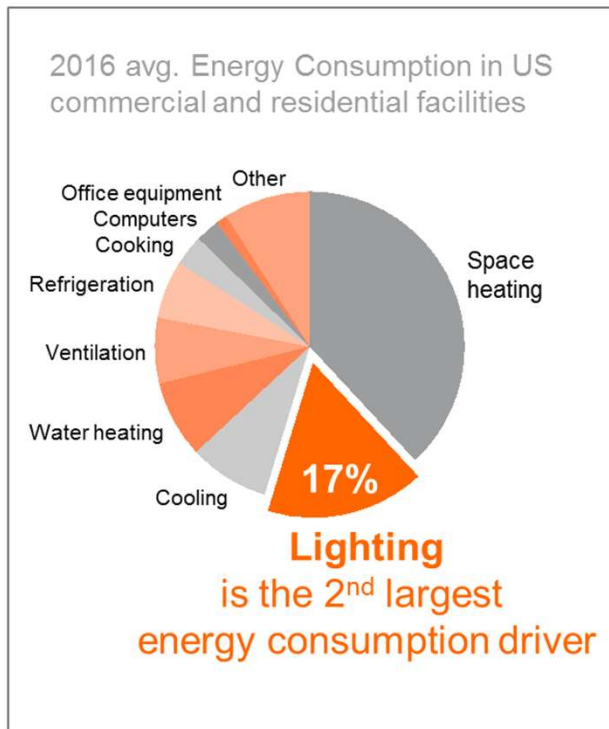
3



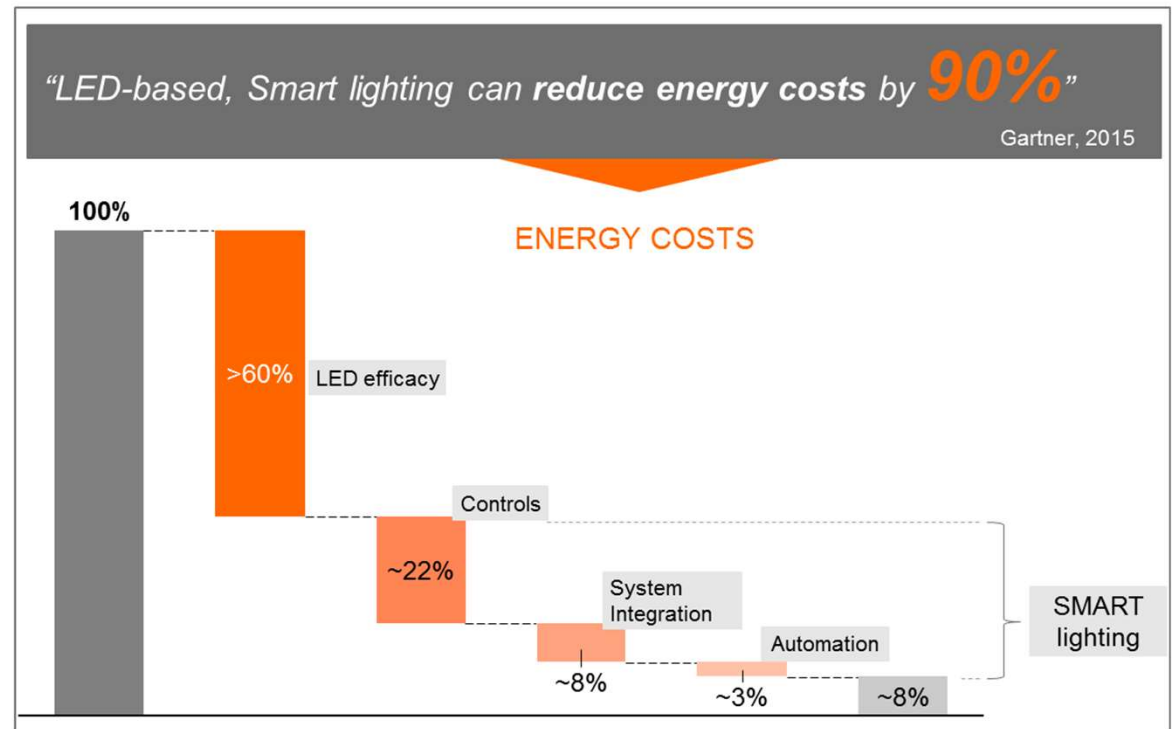
**Increasing  
ENERGY  
EFFICIENCY &  
SUSTAINABILITY**

## ENERGY: New lighting technologies are a key lever to reduce energy consumption

### PROBLEM:



### SOLUTION:





## ENERGY:

LEDVANCE is advancing the energy efficiency of light along 3 dimensions

### LED TECHNOLOGY



Due to low penetration, LED technology still offers a huge lever for energy saving

### SMART LIGHTING TECHNOLOGY



SMART lighting enables energy savings through advanced control, system integration and light automation

### ENERGY ANALYTICS & ADVICE



Analytics services drive adoption rates through consumer awareness and quantify cost savings potentials

# LEDVANCE



# Best Practice by LEDVANCE Engineering

## Smart Factory Solutions out of the Cloud

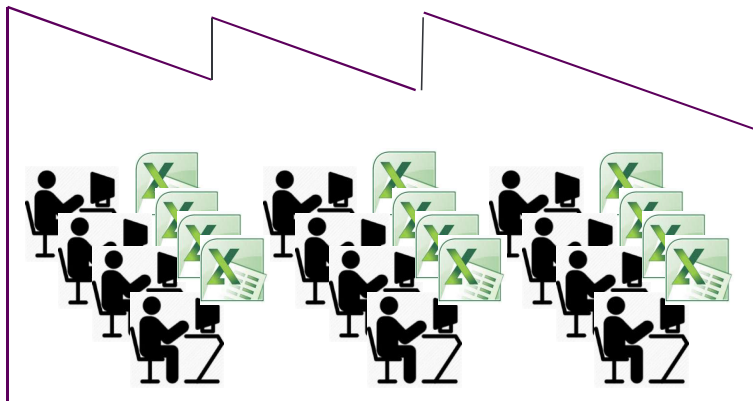




# Approach & Evolution cloud-based Generating of KPI's

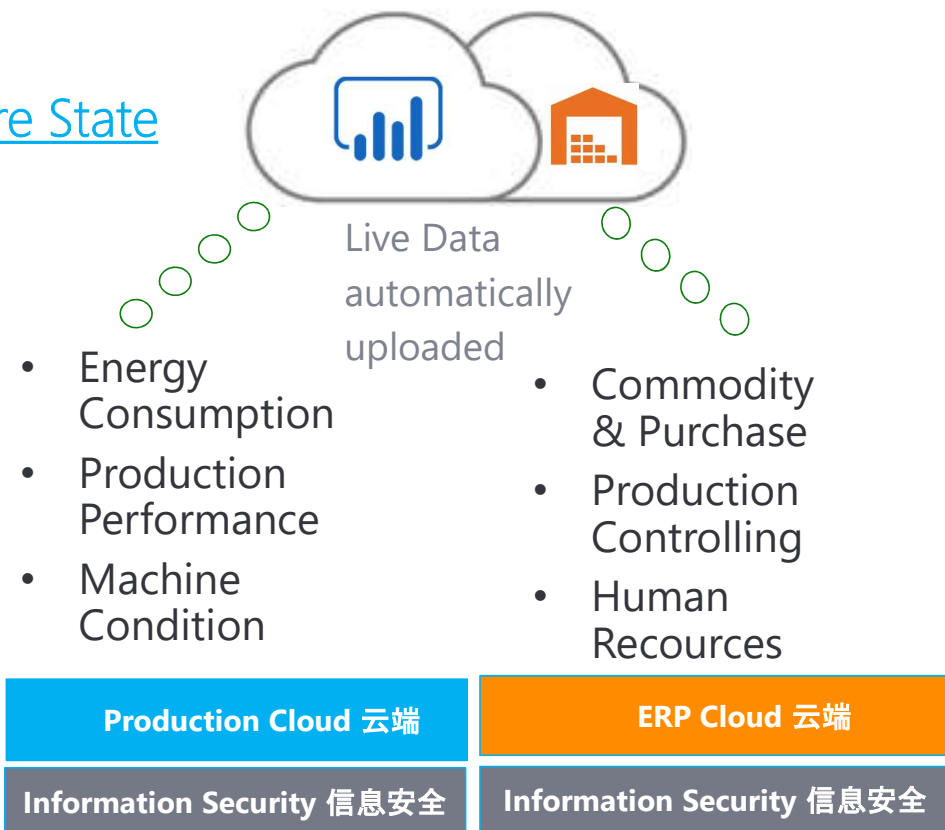
## Fusion of MES & ERP platform required for digital transformation

### Initial State



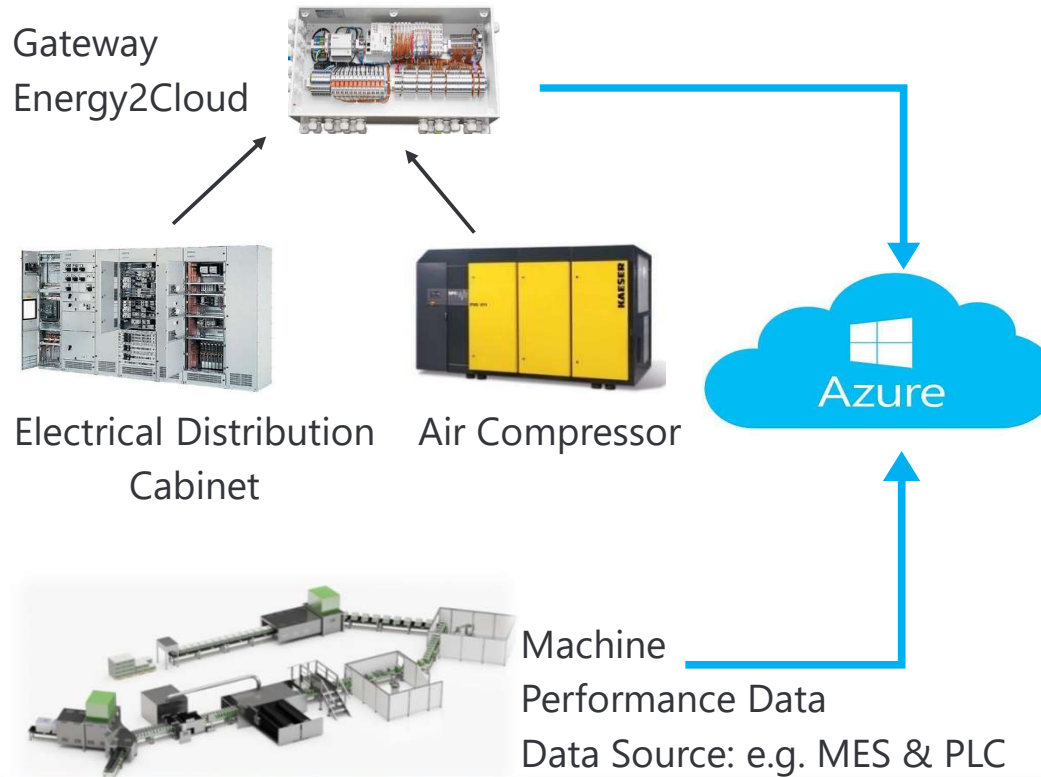
- departments using their own computer and software.
- data are collected manually per week/month with delay

### Future State





## Best Practice: Energy Performance Indicator @ MLS Industry 4.0



24/7 365 day



- Energy Consumptions & Machine Performance
- Real time reporting on demand

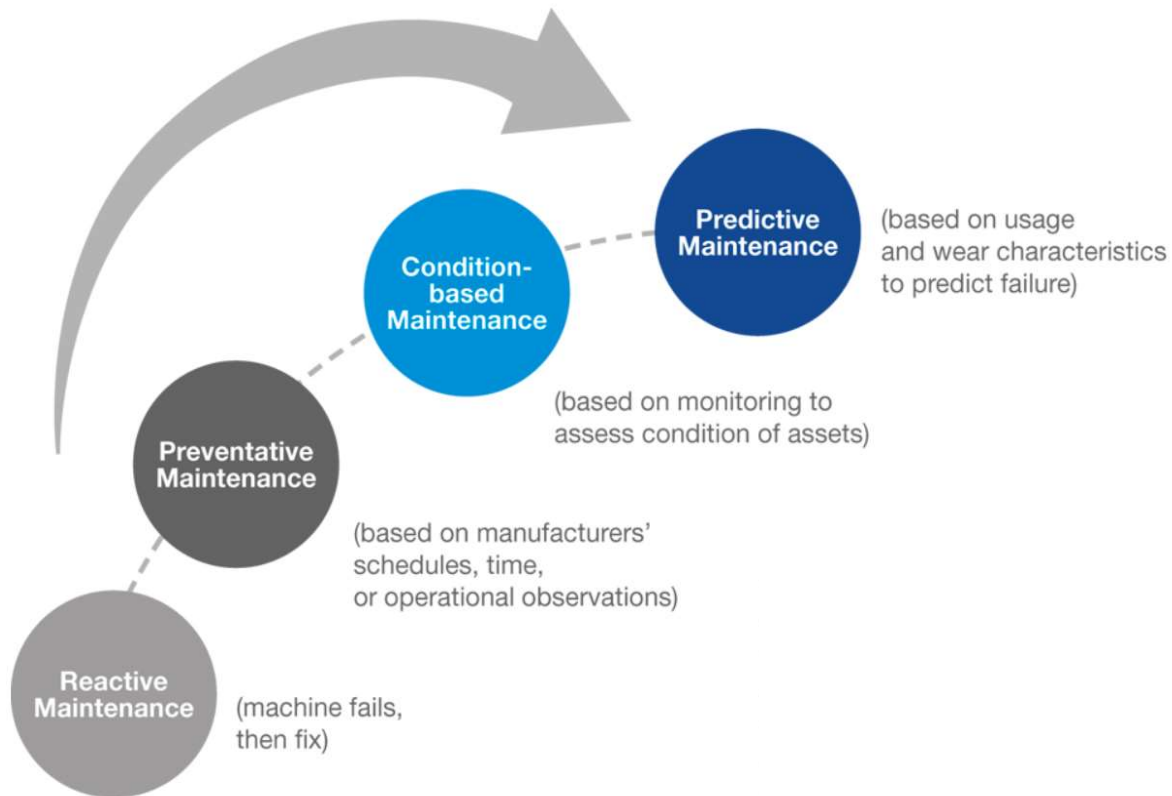


# The role of LIGHT in Industry 4.0

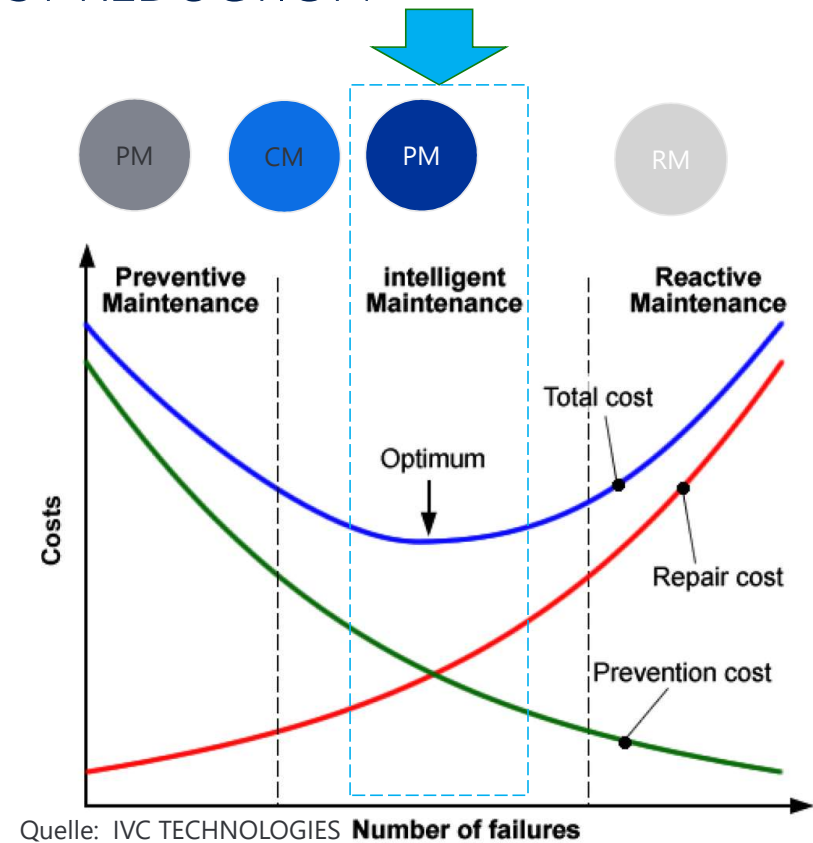
Status signaling & predictive maintenance



## Predictive Maintenance – Motivation & Benefit: COST REDUCTION



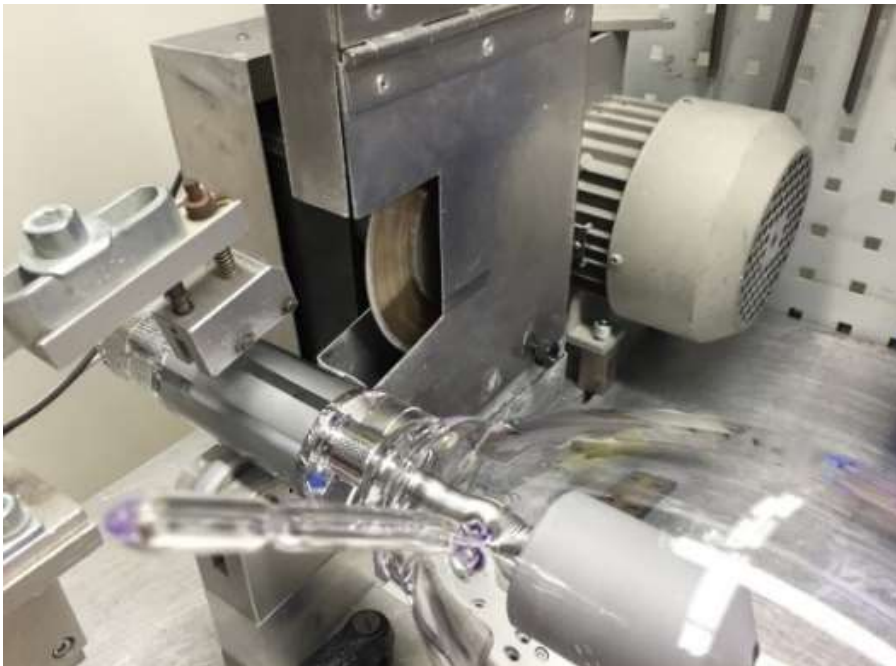
Quelle: Dividella AG



Quelle: IVC TECHNOLOGIES



## Digital lighting solutions for industry application – LEDVANCE example



### SITUATION

- PROBLEM:  
The cutting of special lampes led to high breakage  
**High scrap rate → high costs**
- REASON:  
Due to blunt cutting blade, operators had to push with higher force → **increased breakage**
- CHALLENGE:  
Replacing old paid-down machines with newer ones is **expensive**  
Digital revamping of old machines is **hardly offered** by machine producers

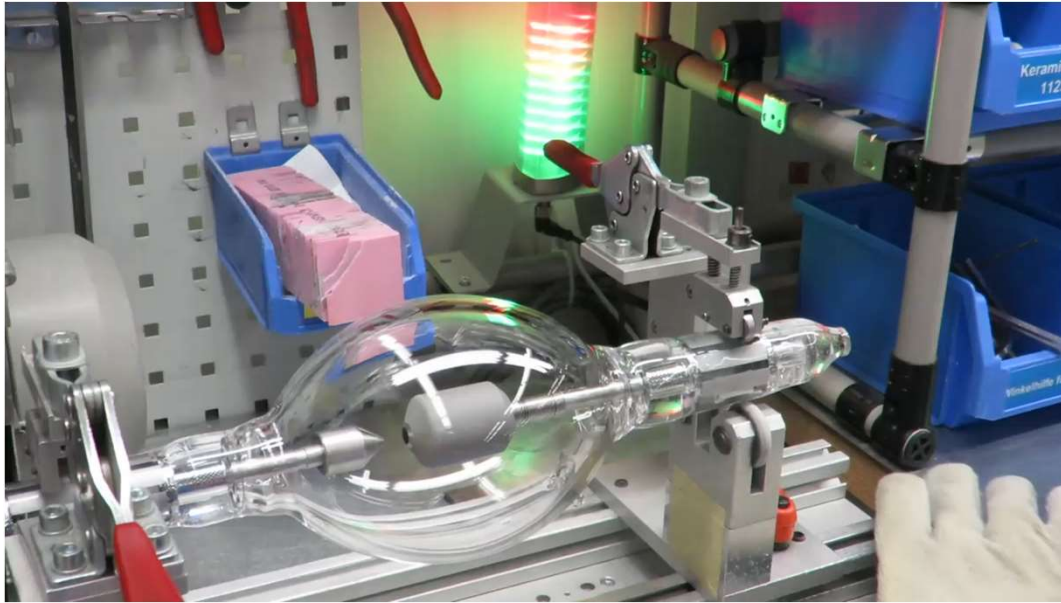




## Digital lighting solutions for industry application – LEDVANCE example

SOLUTION:

User-friendly feedback to operator through control lights and predictive maintenance



### INDUSTRY 4.0 Lighting Solution:

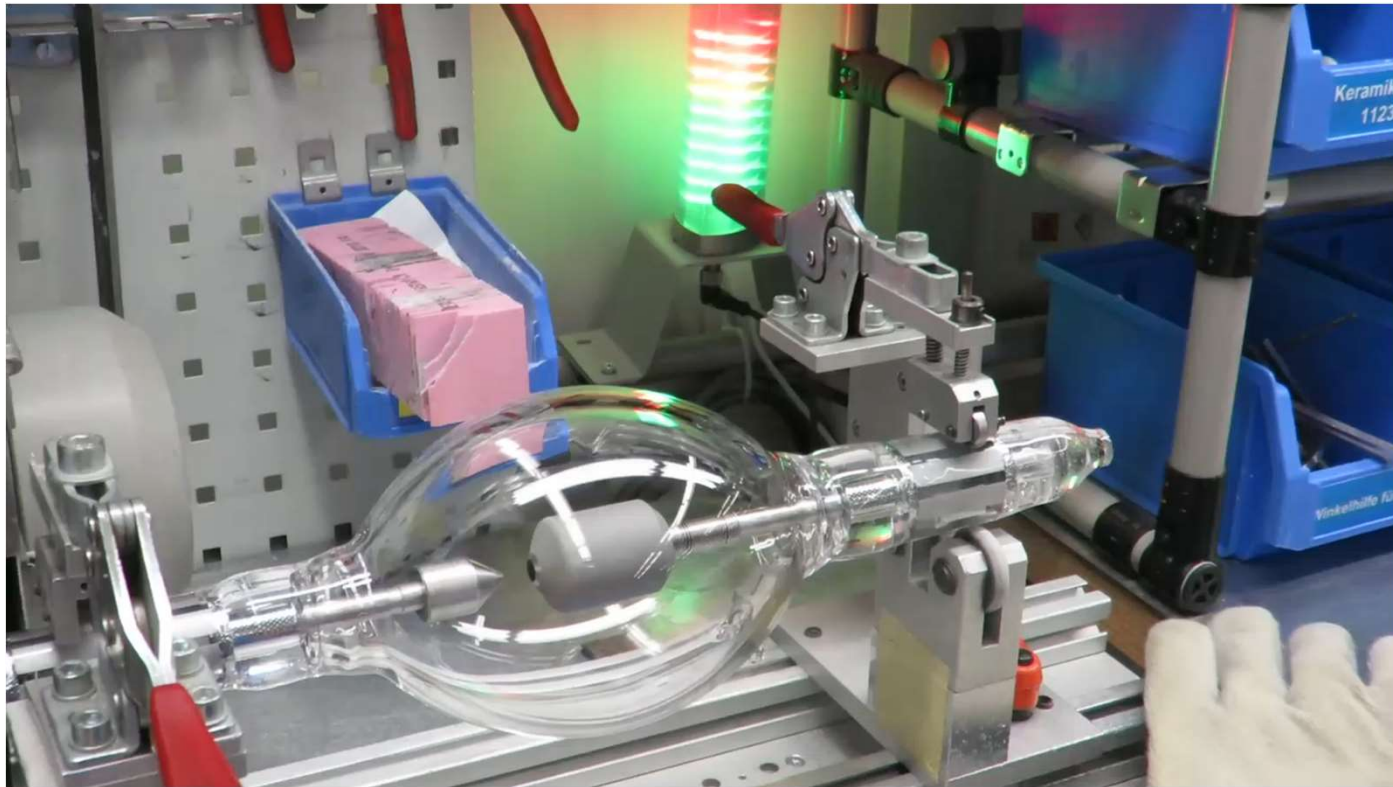
- ASSIST: Visualization of the blade pressure via control light  
→ Operator gets informed about blunt blade BEFORE breakage occurs  
→ **Avoiding scrap and costs**
- AUTOMATISATION: Sharpness of blades and operating pressure are correlated; this information can be directly provided to maintenance department  
→ **Replacement of blade at ideal point in time**





## Predictive Maintenance & Operator assistance

DEMO  
VIDEO



# „Light Efficiency Cloud“



## Analytics & Advice



Powered by







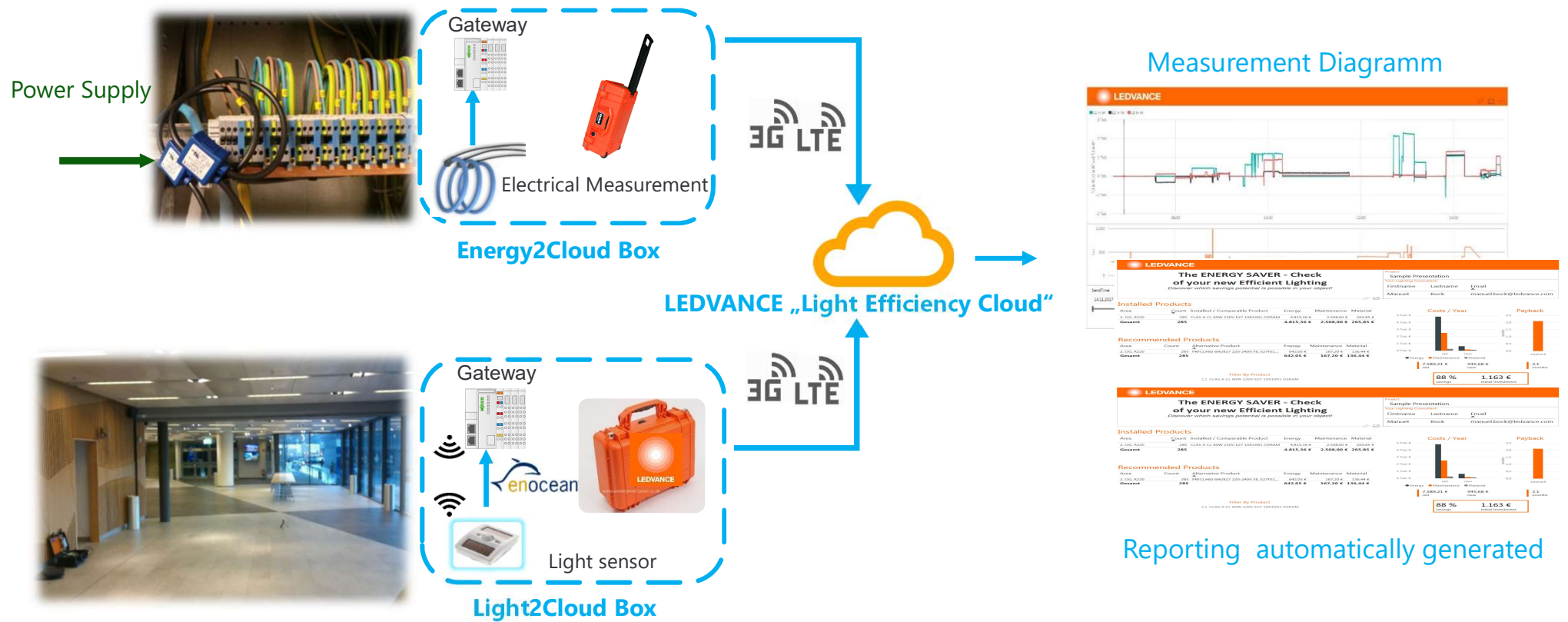
# 1. Light consultant system: Light Efficiency Cloud

- Relocation of the consulting process from consulting knowledge on an Excel basis to the cloud with self-learning selection process
- Measurement of light efficiency with a self-developed Light2Cloud Box
- Measurement of electrical power with a self-developed Energy2Cloud Box
- Data are sent encrypted from boxes to the cloud
- Data will be immediately available to any authorized user regardless of time and location





# 1. Light consultant system: Light Efficiency Cloud

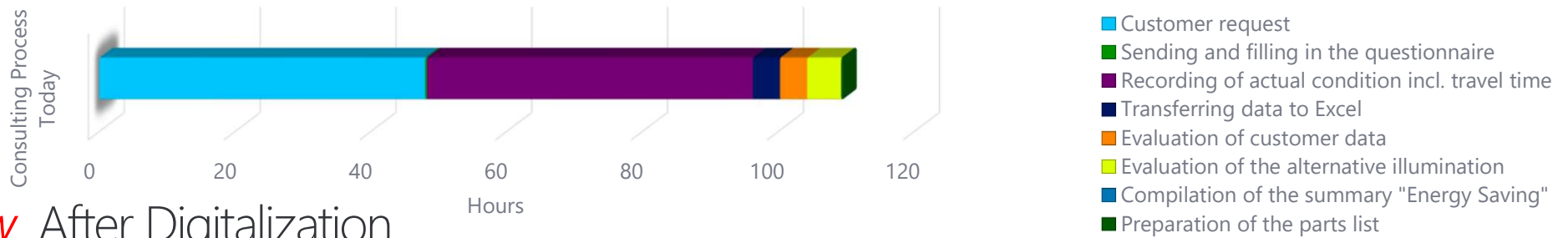




# Benefit of Digitalization

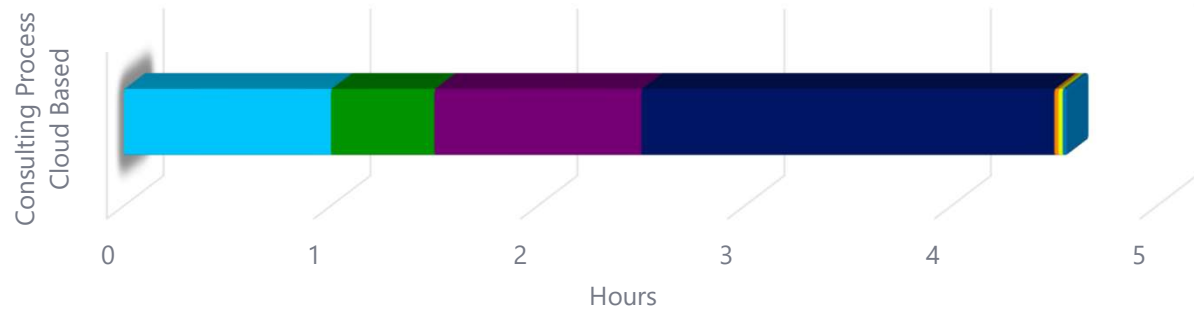
Consulting Process time reduced from 100 hrs to 5 hrs !

## Traditional

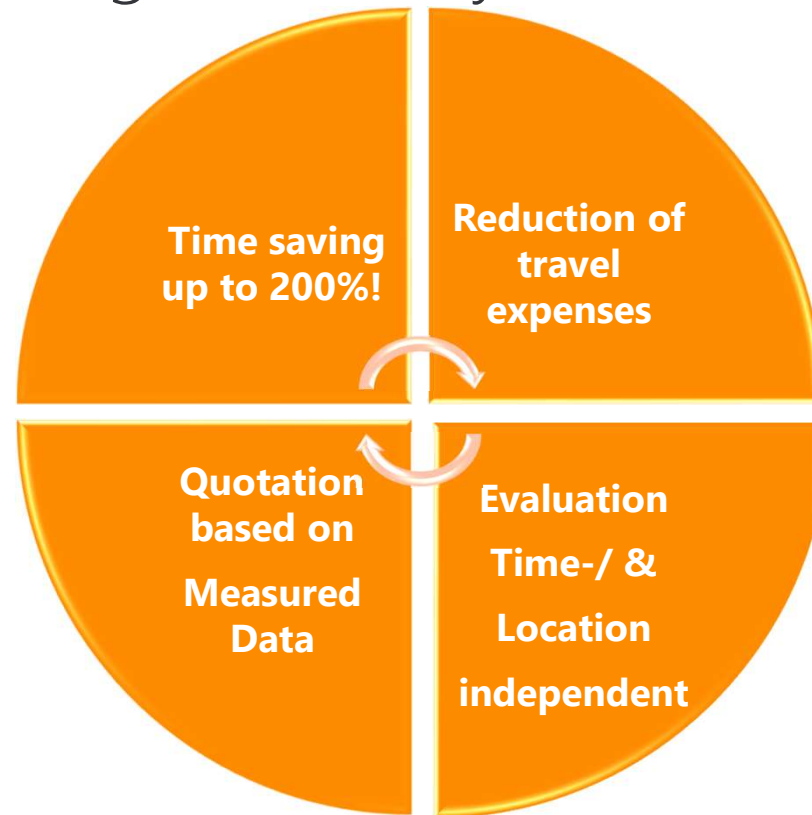


## *new* After Digitalization

- Customer Request
- Creating the project file
- Sending and filling in the questionnaire
- Evaluation data by LEDVANCE
- Calculation of the new lighting
- Preparation of savings potential report
- Preparation of project / order documents



# Advantages of the Light Efficiency Cloud







---

**Show cases**

**Auf Ausstellungsfläche  
Microsoft München**

---



# Condition Monitoring in a Smart Building

Live Data from Air Quality and Equipment Condition visualized by Smart Light

Temperature,  
Humidity&CO<sub>2</sub> Sensor



Illumination&  
Occupancy Sensor



Ledvance2Cloud-Gateway



Local Information Display



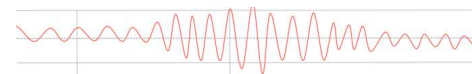
Detail Display

Visualization of Sensor Data

Transformation of Sensor Data



Temperature, Humidity & CO<sub>2</sub>



Sensor Data: Current (Ampere)



DEMO  
Smart Light  
Industry

Jalousie -Motor





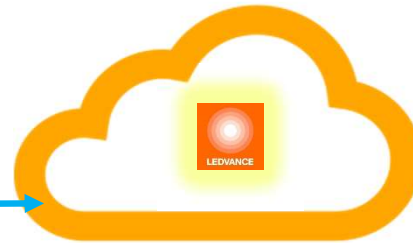
# Predictive Maintenance

Live Cycle-/ & Energy Data of Lighting Systems combined in one Monitoring System

Beschattung

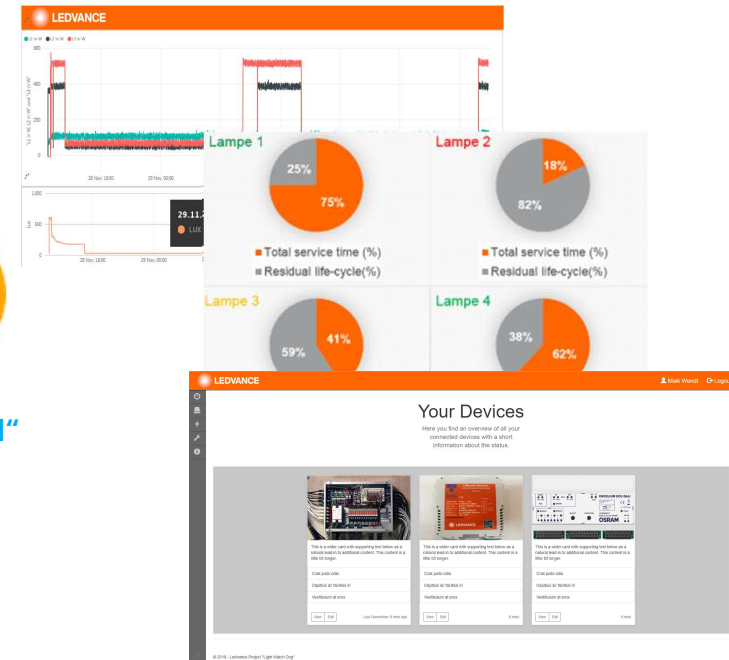


Lichtsteuerung / DALI



LEDVANCE „Light Efficiency Cloud“

Visualisierung & Reporting







THANK YOU

---

LET'S REDEFINE  
THE ROLE OF LIGHT...

... TOGETHER

---

