The Storm Before The Storm - The Luminaire Industry Beyond LED Replacement

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Two common misconceptions about LED and luminaire makers…

#1 LED **completely** changes the business model of a luminaire maker

#2 LED does **not** change the business model of a luminaire maker **at all**

Has he gone crazy?

~~#1 LED **completely** changes the business model of a luminaire maker~~

~~#2 LED does **not** change the business model of a luminaire maker **at all**~~

Maybe…

LED on its own does **not** drastically change the business model of a **luminaire maker**

BUT

LED disrupted the overall value chain in the **lighting industry**. This **disruption is a catalyst** for other changes which have **significant** effects on luminaire makers

By now we know that the Simpsons are good at predicting the future, so…

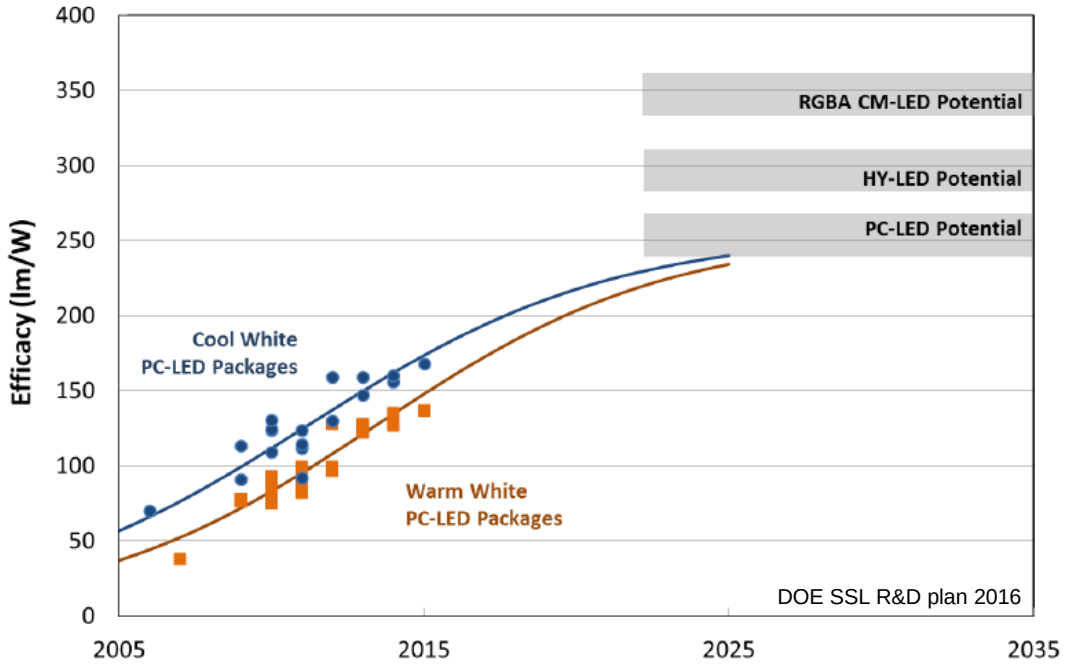
20th Century Fox

Overview

- Where do we stand today?
- The Value Chain
- Differentiation then / now / tomorrow
- The R&D challenge…
- The Business Challenge…
- Conclusion

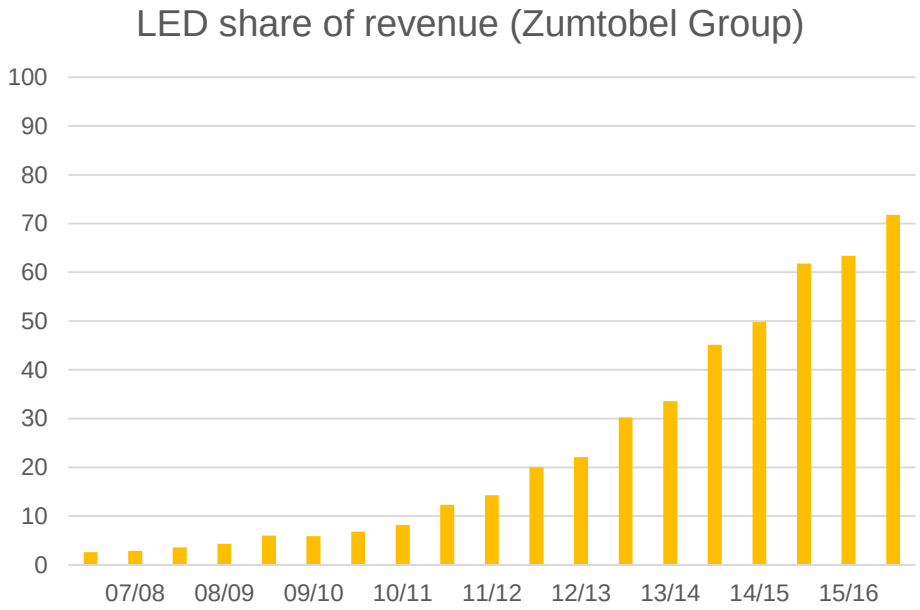
Where does the LED transition stand today (efficacy)?

- major efficacy increases realized
- PC-LED efficay development will slow down
- HY-LED and RGBA limited by cost, technical issues and availability

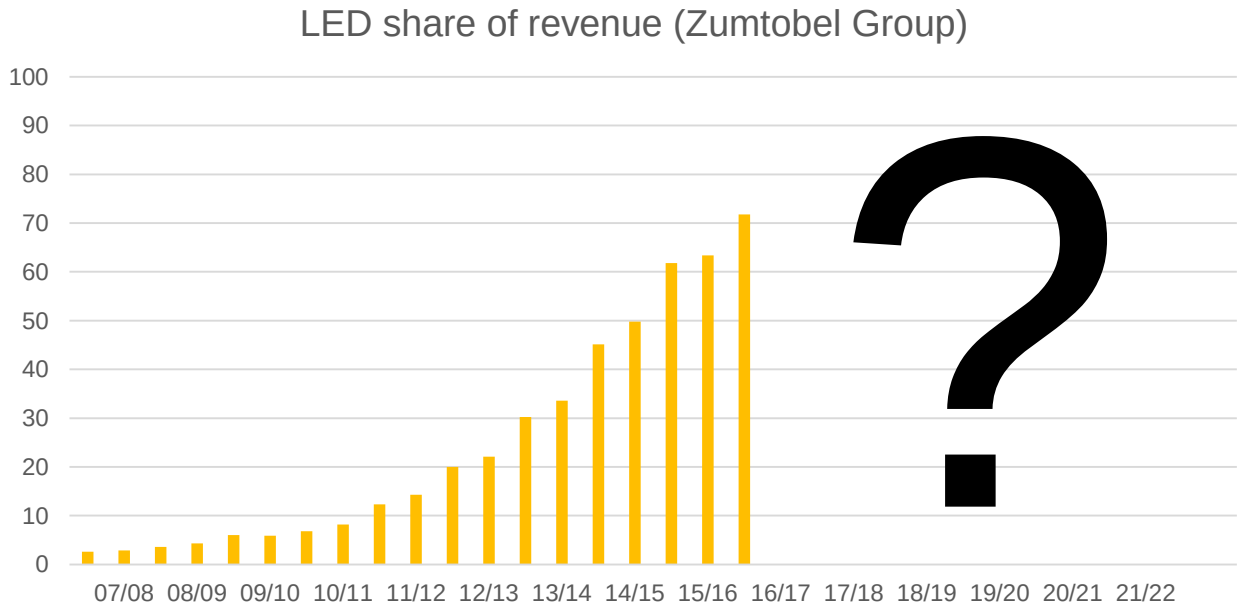


Where does the LED transition stand today (business)?

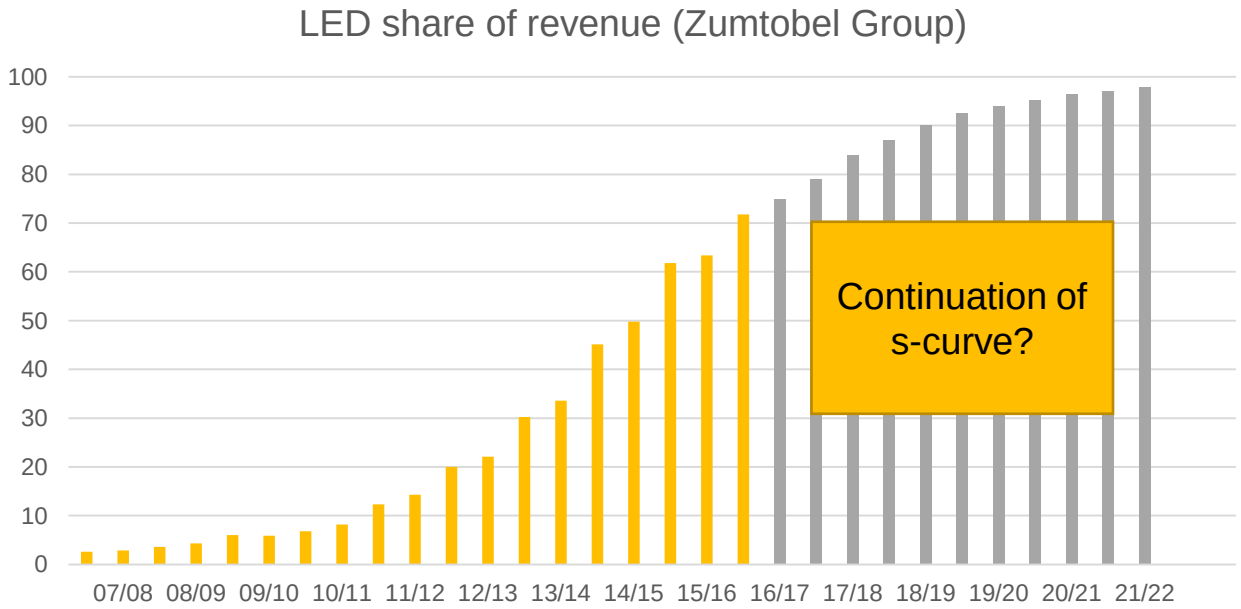
- very succesful development
- hockey stick development in last 4-5 years
- Revenue share >70% (Luminaires & Drivers)
- LED is business as usual!



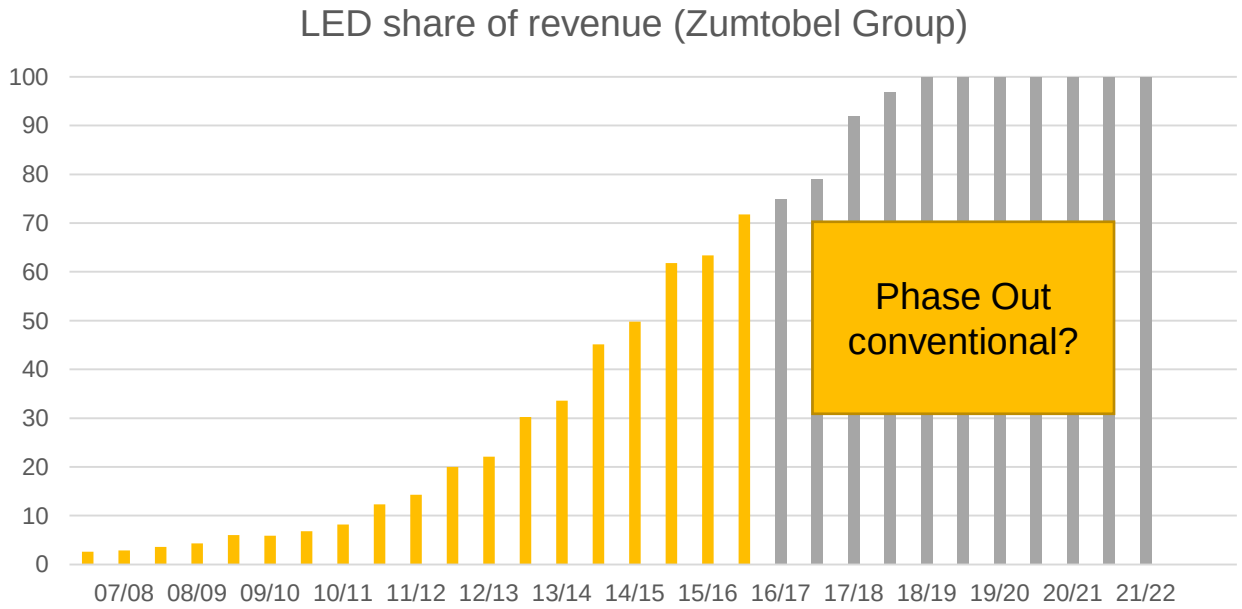
How does it continue?



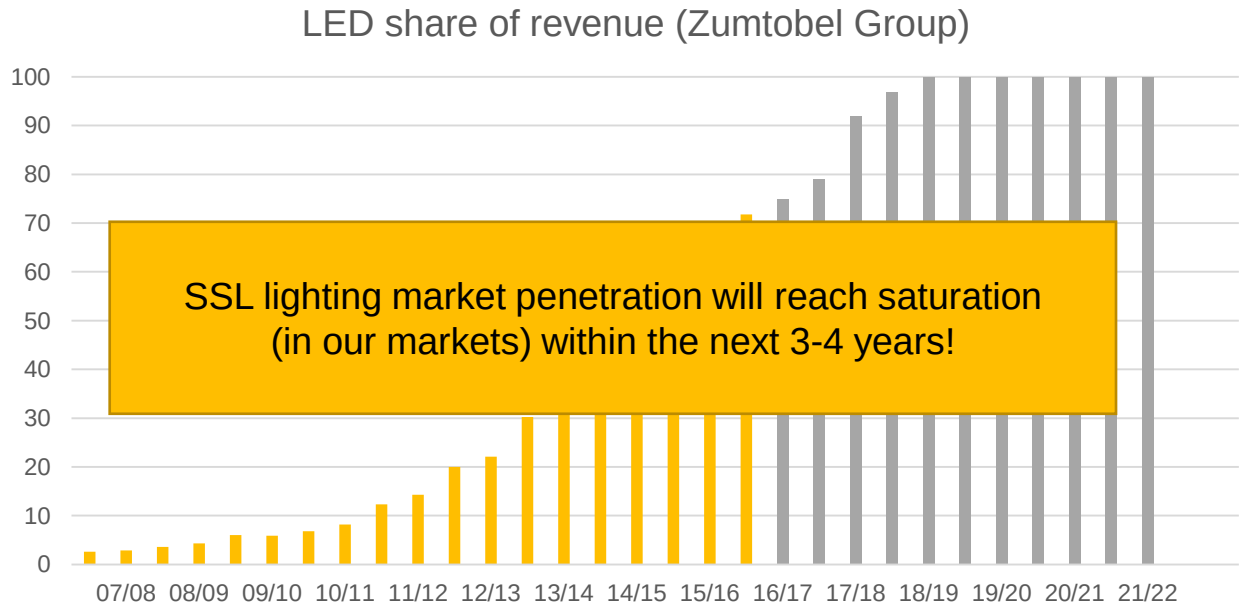
In a „classical“ s-curve?



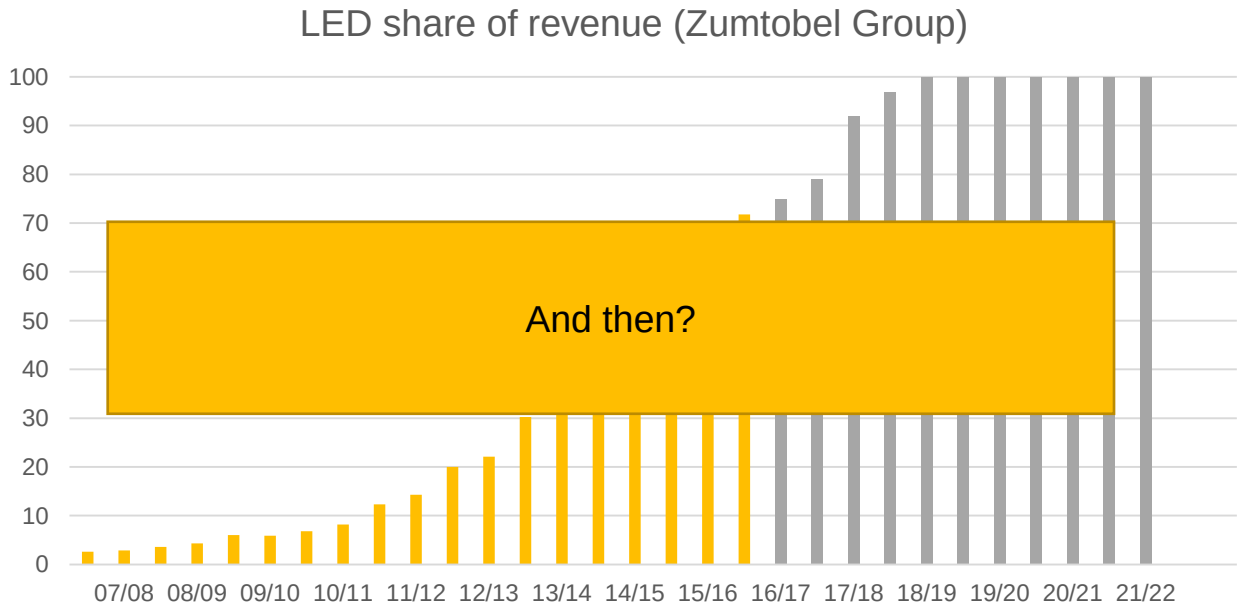
Or in a phase out scenario?



One thing is certain…



…but what comes next?



The Value Chain - Time for a look back…

Lamp / Tube	Control gear (LED driver)	Luminaire	Light management	Lighting solution
				

Chip	Packaged LED	LED light source/ module	Control gear (LED driver)	Luminaire	Light management	Lighting solution

…a look at the present…

Lamp / Tube	Control gear (LED driver)	Luminaire	Light management	Lighting solution

Chip	Packaged LED	LED light source/ module	Control gear (LED driver)	Luminaire	Light management	Lighting solution
						

…and at the future

Chip

Pack. LED

Power conv. **(LED driver)**

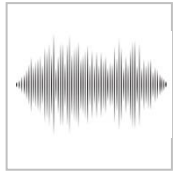
LED module

Optics

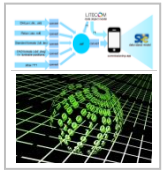
Luminaire

Sensorics

Connectivity



SW, data & Intelligence



Services

Lighting solution

The „good old times“…

	Pre-LED
Differentiator	Optical Design & Light Planning
Key Know How	• Optical Engineering • Lighting Application • Mechanical Engineering
Key Sales Pitch	Lighting Quality, RoI
Why the customer buys it…	Lifecycle Cost, Design
Pricing?	

The world of LED…

	Pre-LED	Rise of LED
Differentiator	Optical Design & Light Planning	LED efficacy, Optical Design
Key Know How	• Optical Engineering • Lighting Application • Mechanical Engineering	• Electronic Engineering • Optical Engineering • Mechanical Engineering • Lighting Application
Key Sales Pitch	Lighting Quality, RoI	RoI, Lighting Quality
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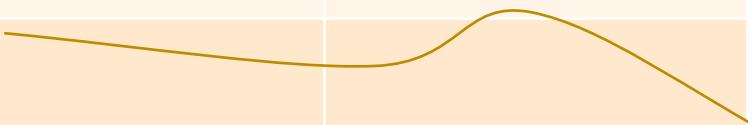
Pricing?		

The Future?

	Pre-LED	Rise of LED	SSL World…
Differentiator	Optical Design & Light Planning	LED efficacy, Optical Design	
Key Know How	• Optical Engineering • Lighting Application • Mechanical Engineering	• Electronic Engineering • Optical Engineering • Mechanical Engineering • Lighting Application	
Key Sales Pitch	Lighting Quality, RoI	RoI, Lighting Quality	
Why the customer buys it…	Lifecycle Cost, Design	Lifecycle Cost	
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?

The future…of the value chain

Semiconductor Industry

Chip

Pack. LED

Power conv. **(LED driver)**

LED module

Optics

Luminaire

Sensorics

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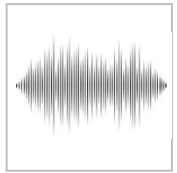

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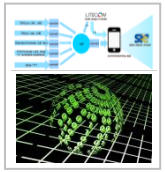

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Lighting solution

The future…of the value chain

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Electronics OEM Industry

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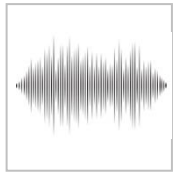

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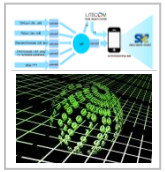

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Lighting solution

…and at the future

Semiconductor Industry

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Electronics OEM Industry

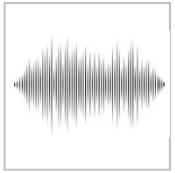
Optics Specialists?

Optics

Luminaire

Sensorics

Connectivity



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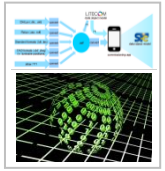

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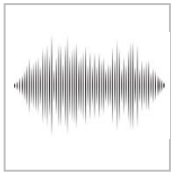

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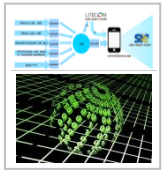


Services

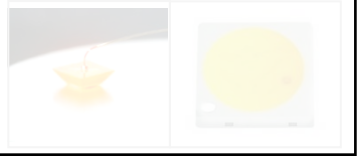
Lighting solution

The future…of the value chain

Semiconductor Industry

Chip

Pack. LED



LED module

Power conv. **(LED driver)**

Electronics OEM Industry

Optics Specialists?

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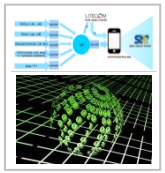

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Lighting solution

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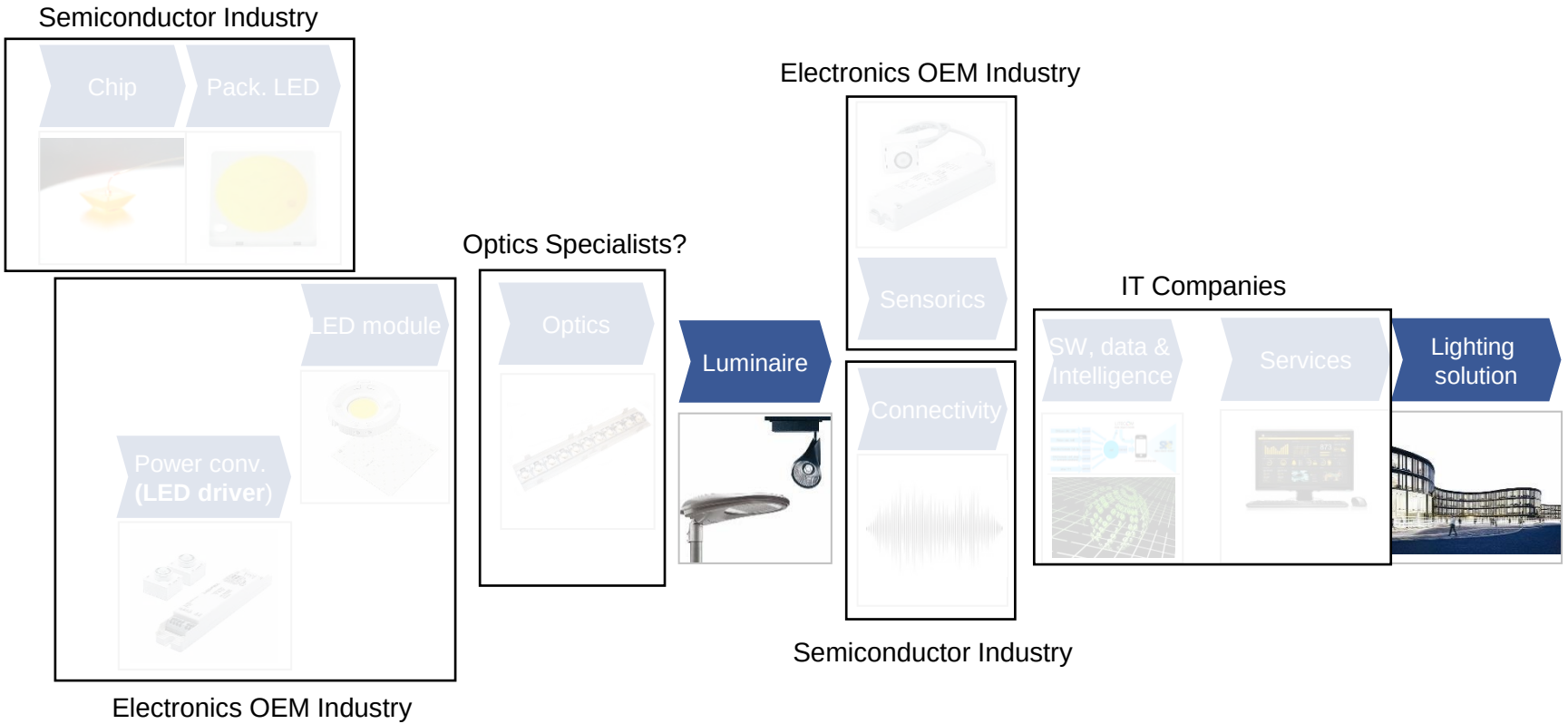
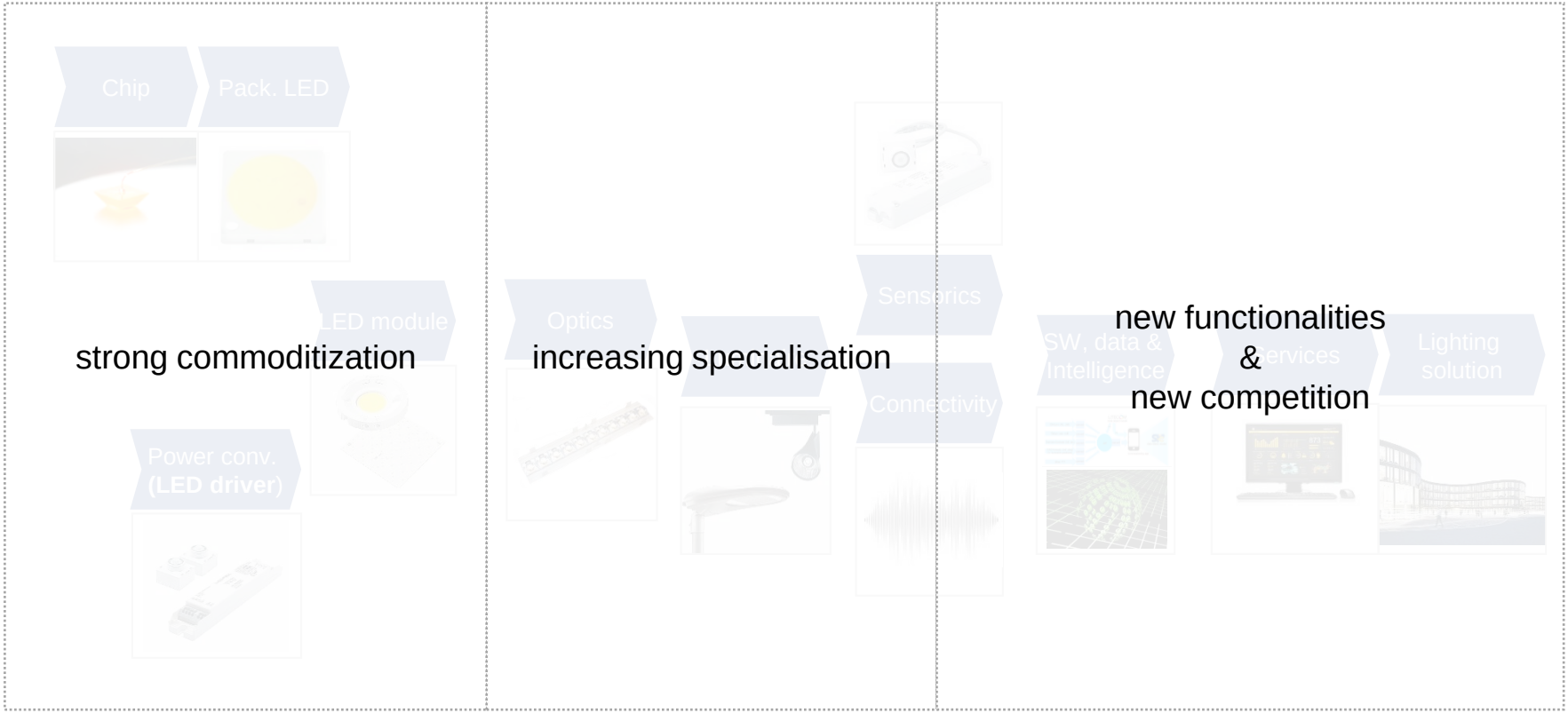


There are a few clear directions…



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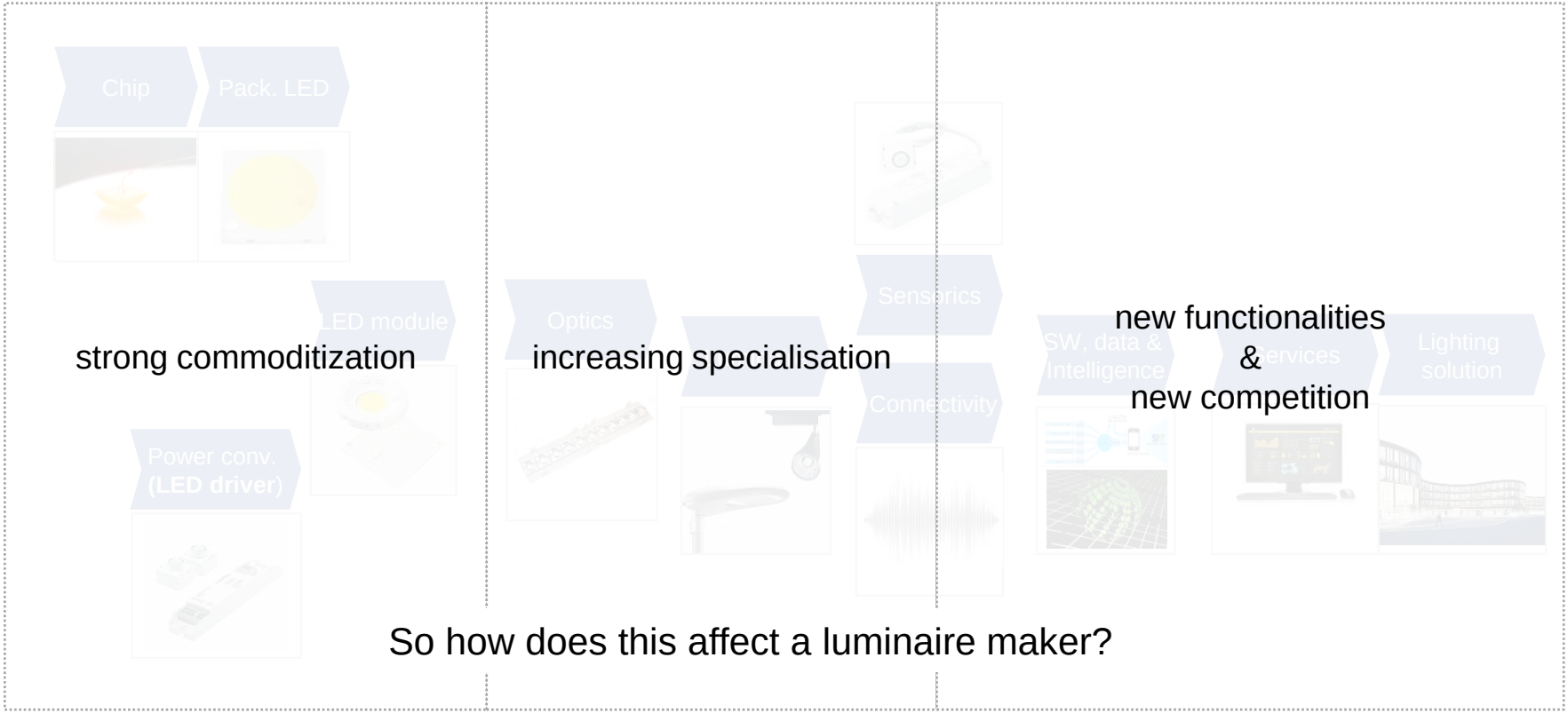


strong commoditization

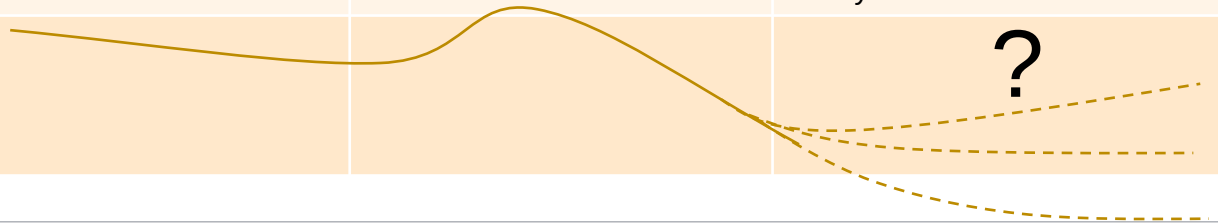
increasing specialisation

new functionalities
&
new competition

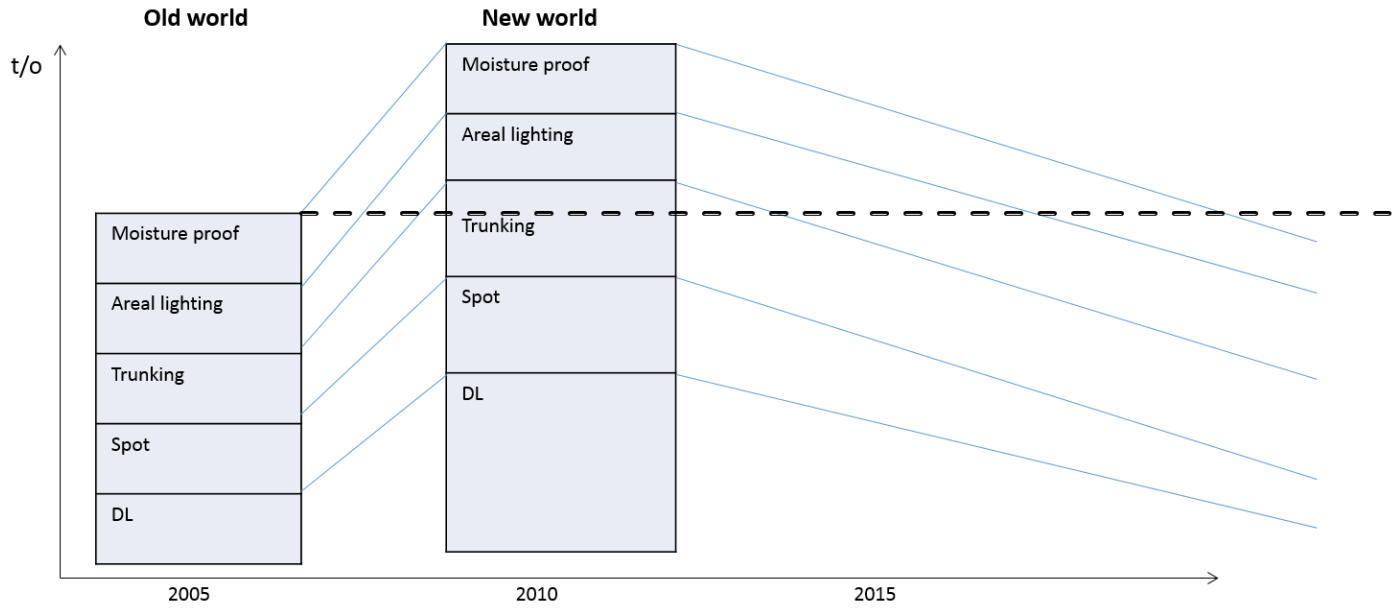
So how does this affect a luminaire maker?

What will be?

	Pre-LED	Rise of LED	SSL World…
Differentiator	Optical Design & Light Planning	LED efficacy, Optical Design	Cost? Functionality? Design?
Key Know How	• Optical Engineering • Lighting Application • Mechanical Engineering	• Electronic Engineering • Optical Engineering • Mechanical Engineering • Lighting Application	• System Integration • Electronic Engineering • Mechanical Engineering • Software / Usability • Design-to-Cost • Lighting Application
Key Sales Pitch	Lighting Quality, RoI	RoI, Lighting Quality	Added Value? Return of Invest? Lighting Quality?
Why the customer buys it…	Lifecycle Cost, Design	Lifecycle Cost	Added Value? Lifecycle Cost?
Pricing?			



Two obvious trends: #1 Cost Down…



LED provided an initial push, but as LED turns into everyday business, Haitz‘ law affects the Luminaire as well…

The path downwards…

In the volume market for LED luminaires it is all about reducing the total cost of ownership and optimising return of invest based on cost savings.

→ As LED efficacy saturates the only differentiator will be cost of the light fixture itself.

→ Result: A downwards price spiral which is already visible in many applications.

Without new functionality, we will find ourselves in a situation where the volume market will be entirely cost driven!

The R&D Challenge – Part I

Balancing conventional porfolio vs. LED portfolio	DONE
Design for LED across entire portfolio	DONE
Keeping up with LED evolution i.e. product maintenance	Ongoing
Reducing cost while increasing guaranteed lifetime	Ongoing
Managing product portfolio complexity	Ongoing
Increasing demand for customer specific products	Ongoing

Reduce Cost

Two obvious trends: #2 Added Functionalities

Human Centric Lighting

- intrinsic lighting topic
- existing know-how in luminaire companies
- **adds cost & complexity**
- good story with scientific background
- **no clear RoI in most applications**
- driven only out of the lighting industry

Connected Lighting

- use-cases in or close to lighting
- some know-how in lighting companies
- **adds cost & increases complexity**
- established market (building automation)
- new entrants from outside of lighting
- **RoI driven by energy efficiency**

IoT Applications

- use-cases beyond lighting
- little or no know-how in lighting companies
- **adds cost & vastly increases complexity**
- Cross industry Megatrend
- emerging market
- key players outside of Lighting market
- **RoI unclear in most use-cases**

The R&D Challenge – Part II

Building Know How in new areas (SW, Sensors, Data Analytics…)	Ongoing
Developing System Integration / Architecture models	Ongoing
Sourcing & Qualification of new components	Ongoing
Variety of old & new standards (ZigBee, DALI, BacNet, Fairhair, Thread, BTLE mesh,…)	Ongoing
Setting up new organisational structures (e.g. DevOps)	Ongoing
Match speed with start-up companies & IT giants	Ongoing

All of which brings us back to…

20th Century Fox

Reduce Cost

Add Functionality

The R&D Challenge – Part III

Requirements

Available Technology

Example: 2.4 GHz radio communication for professional lighting

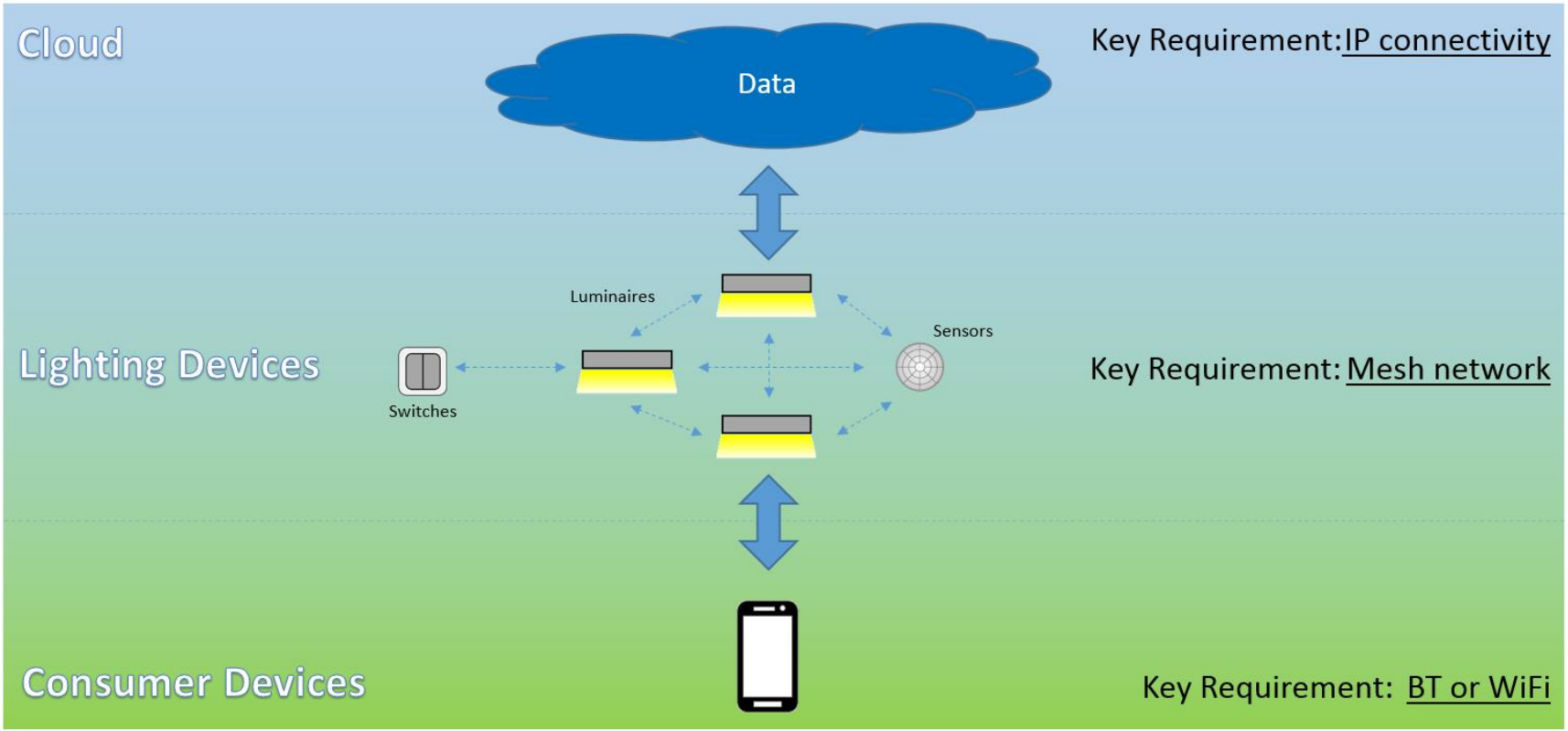
I believe that future smart lighting systems…

…should be IP-based

…need to be easily accessible

…require a mesh network

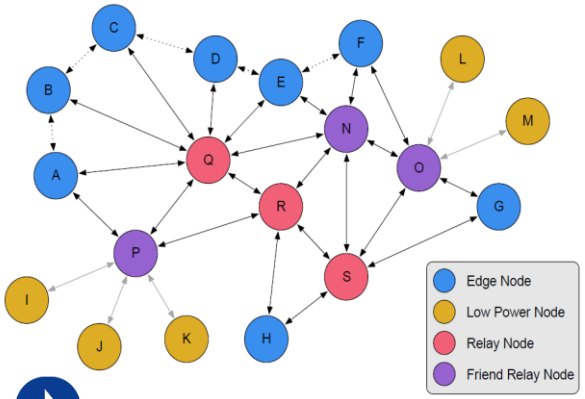
Example: 2.4 GHz radio communication for professional lighting



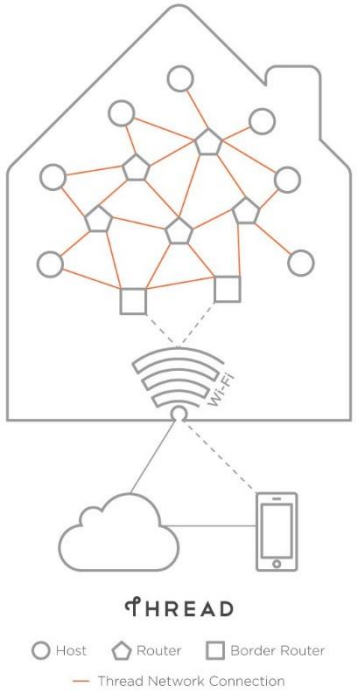
Example: 2.4 GHz radio communication for professional lighting

Both technologies address similar applications (lighting, Home Automation …), but have different scopes and maturity levels.

- **BLE** is a mature technology in point-to-point, but only recently adapted to mesh.
  - Prototype Spec available, adoption expected in April/May'17. Currently only flooding and p2p, routed mesh with rev 1.1, Q3/4 2017.
  - BT 5.0 (2018) will enhance reliability and performance of mesh, eventually with IP support.
- **Thread** is natively designed for IP based routed mesh, but is not yet market proven.
  - Thread 1.1 (targets home applications), released last year and products now in certification.
  - Thread 2.0 will expand scope to professional applications with enhanced security and commissioning provisioning.



BLE Mesh architecture



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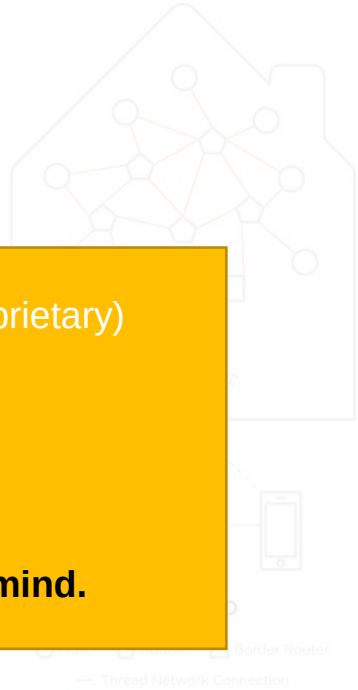


These are only two prominent ones…there are dozens more (mostly proprietary)
Neither technology is 100% ready today
Which one wins / survives is anyones guess at the moment
In 2-3 years the technologies will (hopefully) converge

In uncertain times: Neither wait nor aim for perfection.
Pick what is best for the application and the product you have in mind.

Speaking about perfection…




A big part of the value Lighting offers for IoT use-cases lies in good system architecture

The difficulty: Finding the balance between integration / speed / cost / complexity!

The Business Challenge

Customer‘s willingness to pay

Additional Functionality

Adding Functionality and Value…

Adding new funcationlities to lighting offers the potential to add real value to the light installation and the chance to unlock new revenue streams.

Lighting Driven Use Cases

Data Driven Use Cases

The Challenge I: What will drive luminaire design of the future?

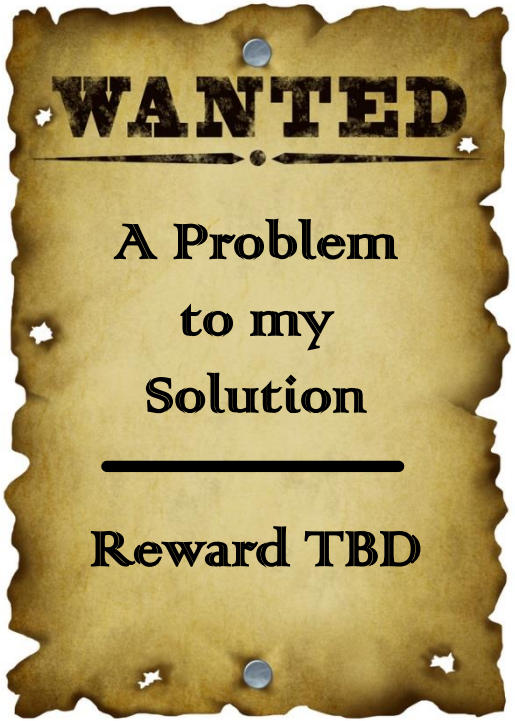
At one point mobile phones were designed to achieve best possible quality on phone calls…
…now they are designed to be portable multi-media access points and the phone feature is just tagging along.

Lighting Driven Use Cases

Data Driven Use Cases

The more the intrinsic value of a luminaire shifts, the more luminaire manufacturers will have to adapt in order to differentiate and defend their own value-proposition.

The Risk II: Where is the value…



<u>Some new functionalities can prove their value easily:</u>

Space management – by measuring the rent / energy saved

Remote Monitoring – by measuring cost saved

Metering – by measuring energy saved

<u>With others it is far less clear:</u>

Indoor Navigation – Does this increase the retailers revenue?

Ambient Air Measurement – Once known how to turn into money?

Human Centric Lighting – It is pleasant, but how can you put a number to it?

The Risk II: …and getting the customer to pay for it!

Selling via reducing total cost of ownership

or

Selling via added value which increases revenue

The customer wants proof or he is not going to pay!

Conclusion

- The disruption caused by LED will continue to change the landscape of the lighting industry
- Much of the disruption will not come via the LED technology itself, but by it breaking down barriers to other industries
- Two trends will continue to strengthen as LED technology saturates:
  - Cost Pressure will drive prices for volume products
  - Added Functionality will (hopefully) counteract this
- R&D spending of luminaire manufacturers will have to adapt significantly in either scenario
- New functionalities and their added values look promising, but they are just starting out…

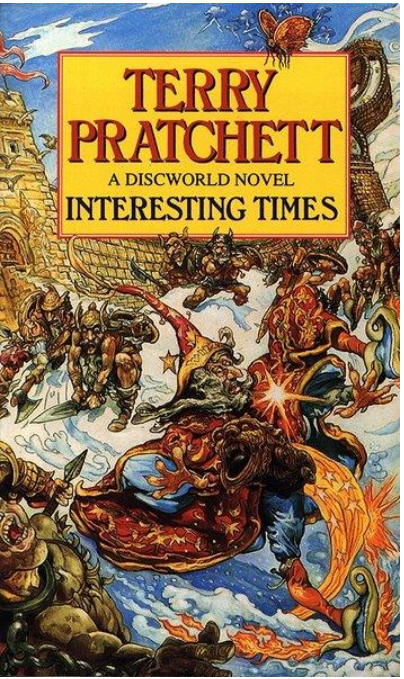
The 3rd Misconception

Lighting is boring…

The 3rd Misconception

~~Lighting is boring…~~

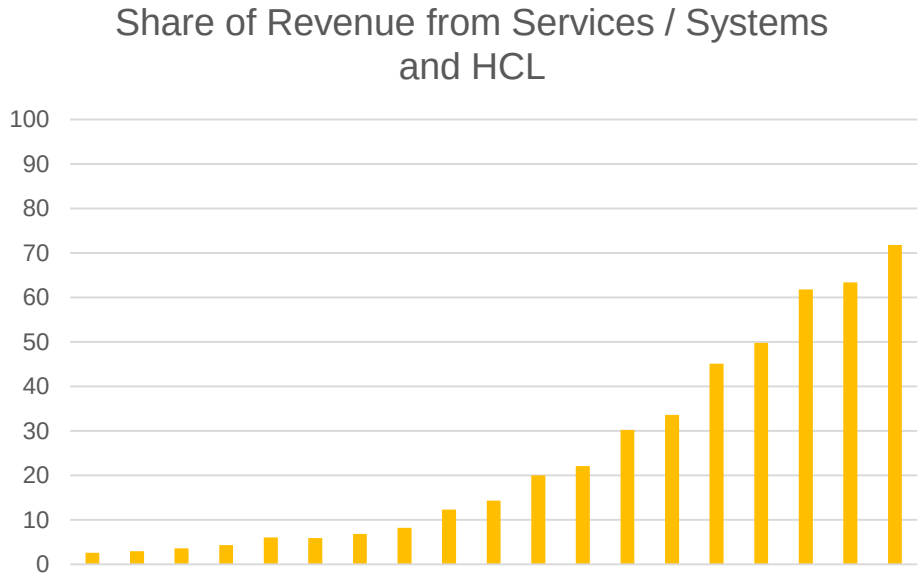
The 3rd Misconception



May you Live in Interesting Times!

- not actually a Chinese curse

…and hopefully in a few years I can show a slide like this



Many thanks for your attention!