Role of technology in a sustainability strategy

LED event: Elewijt December 2, 2015

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Sustainability & Technology

- Technological changes & societal changes
- How are they related ?
- Finding opportunities
- Inspirational cases
- Strategies
- Where to start ?
- Action

Question ?

What will be the main contributor to eco-footprint reductions?

Technological changes

Societal changes

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Pressure on energy using products

Determining the resource and energy use

Energy Usage of LED products	=	Number of users	X	LED Products/ user	X	Energy efficiency/ LED product

Resource Usage in LED products	=	Number of users	X	LED Products/ user	X	Resource used/ LED product

Sociological   **Technological**

Technology and behavior are equally important

Business Models affect on the behavioral level.

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The challenge

Image : Greeneris.com

High resource efficiency – Low energy efficiency	**High resource efficiency – High energy efficiency**
Low resource efficiency – Low energy efficiency	Low resource efficiency – High energy efficiency

How to stay profitable with long lasting resource efficient lighting products?

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Martec's laws shows the way to opportunities

Major changes
Internet of Things
Integrated sensor
Additive manufacturing
Big data analytics
Artificial intelligence

technology changes exponentially

technology management is deciding which changes are adopted

?

?

Lighting company

organizations change logarithmically

by Scott Brinker @chiefmartec http://chiefmartec.com
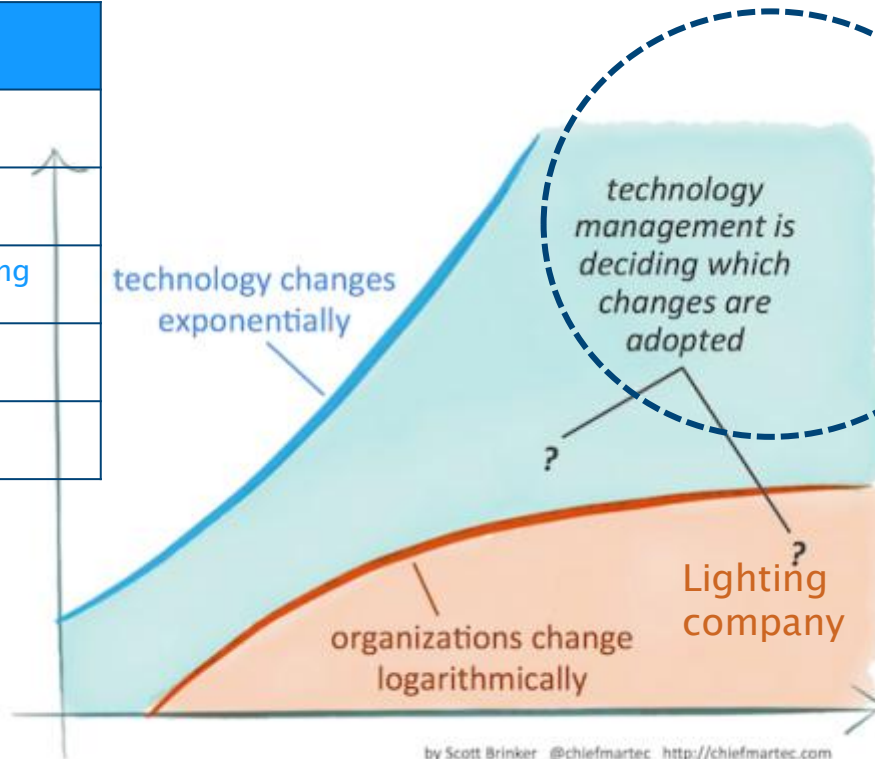
Image : chiefmartec.com

7 Mega Trends

From	To
Product ownership	Product use
Global	Glocal
Linear	Circular
Care	Active participation
Vertically organized	Horizontally organized
Competition	Collaboration
"I " and "me"	Different forms of "we"

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Example focus area's

HOME	ELDERLY HEALTH	24/7 WORK 9-5 WORK
RESIDENTIAL	EDUCATION MEETING ROOMS OFFICE	INDUSTRIAL
AUTOMOTIVE	HOSPITALITY DECORATION	SHOP
BACKLIGHTING	ARCHITECTURAL	OUTDOOR

Focus areas

HUMAN CENTRIC LIGHTING

LIGHTING DESIGN

SYSTEMS ENGINEERING

GREEN BUSINESS DEVELOPMENT PROCESS

GREEN SOCIETAL DEVELOPMENT PRIORITIES
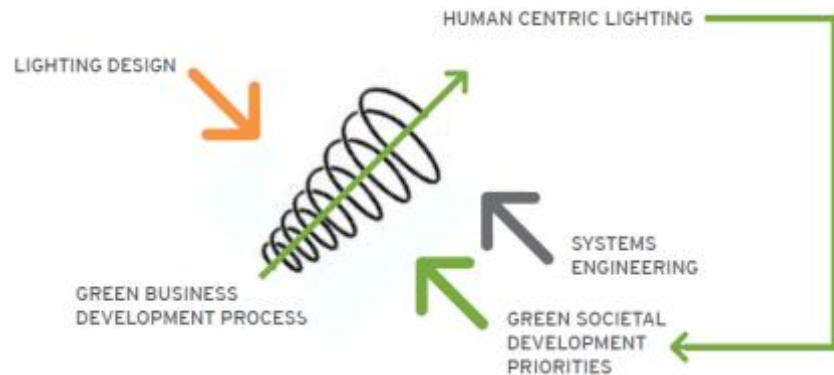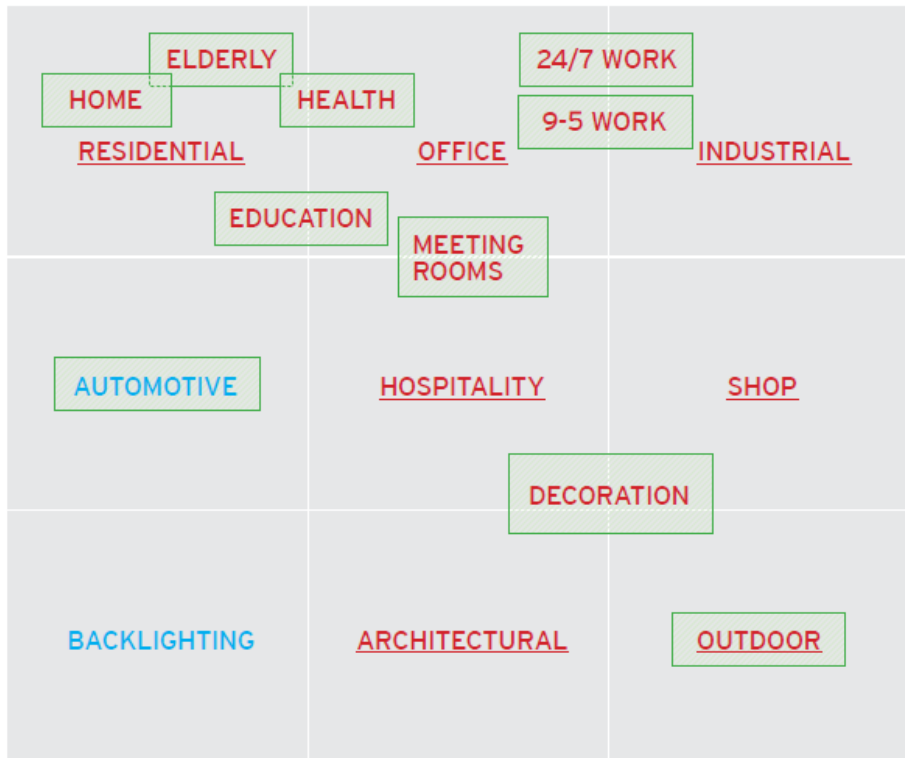
lightingforpeople
CONNECTING OPPORTUNITIES FOR INNOVATION

Source: www.Lightingforpeople.eu

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Potential markets

SUGGESTED EUROPEAN DEVELOPMENT AREAS	TIME FOR START UP	AWARENESS, CUSTOMER VALUE & SOCIETAL VALUE	POLITICAL FRAMING	2020 POTENTIAL (MILLION EURO)		HCL + ILS MARKET (MILLION EURO)	
				HCL	ILS	2017	2020
Smart Systems	now	societal development	digital agenda	600	1900	900	2500
Indoor				580	1220	400	1800
Outdoor				20	680	500	700
Energy Savings	on-going	sustainable development	energy saving	70	2030	2600	2100
Indoor				50	1350	1600	1400
Outdoor				20	680	1000	700

HLC: Human Centered Lighting
ILS: Inteligent Lighting control and supervision

Source: lightingforpeople.eu

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Light as a Service

Architect Thomas Rau asked Philips: "
Listen, I need so many hours of light in my premises every year. You figure out how to do it. If you think you need a lamp, or electricity, or whatever – that's fine. But I want nothing to do with it. I'm not interested in the product, just the performance. I want to buy light, and nothing else."

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Light as a service

Approach:
1) Analyze, Light plan and Selection of armatures,
2) Decision: light as a Service, lease or buy
3) Installation
4) Maintenance
5) De-installation & recycling

Customer value (service):
- No investment
- Cost reduction (15 to 40%)
- Lower CO_2 emission (50 to 80% reduction)
- No cure, no pay low risk (financial and physical)

Technology:
- Design for serviceability, upgradeability
- Controls, data capture,…
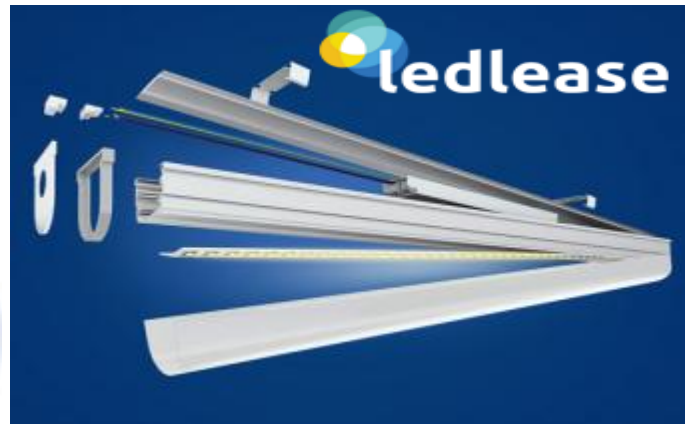
Bio economy

BITE ME
Design Victor Vetterlein

Eatbable led desk lamp
- Bio degradable material
- No toxic colorants
- No toxic glues
- Led strips easy to peal off

Printed electronics using natural, compostable materials and inks

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Pressure on agricultural model

City Farming

To our City Farm booklet

PlantLab

Cutting edge technology in agriculture
can help feed everyone on the planet.
Grown locally. Plant friendly.

1 m² of PPU **growing space** produces **200g** of fresh fruits and vegetables for **one person per day** for a year

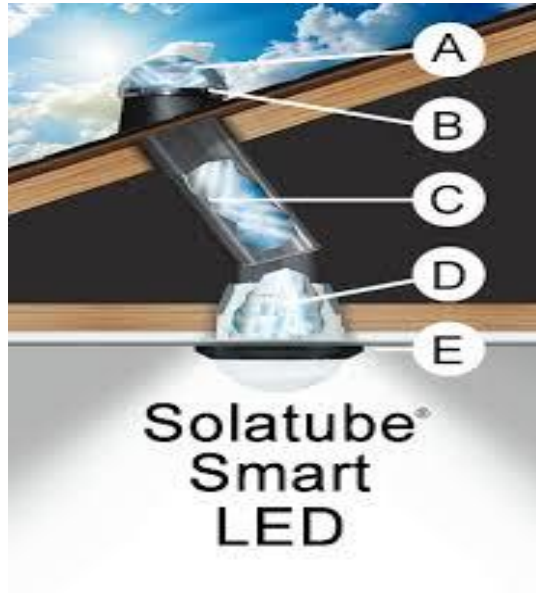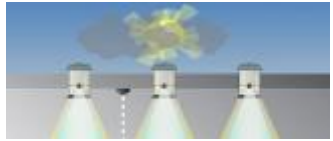**sirris**
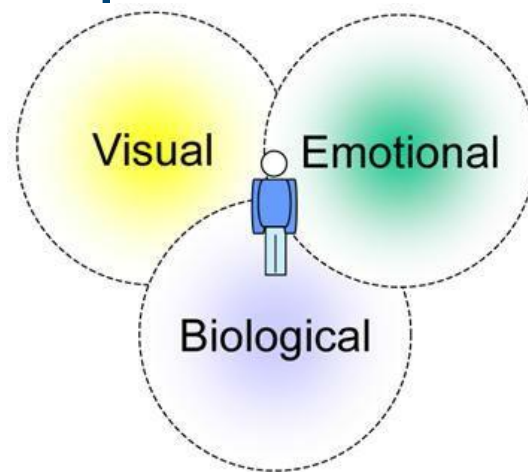driving industry by technology

Trend zero energy houses
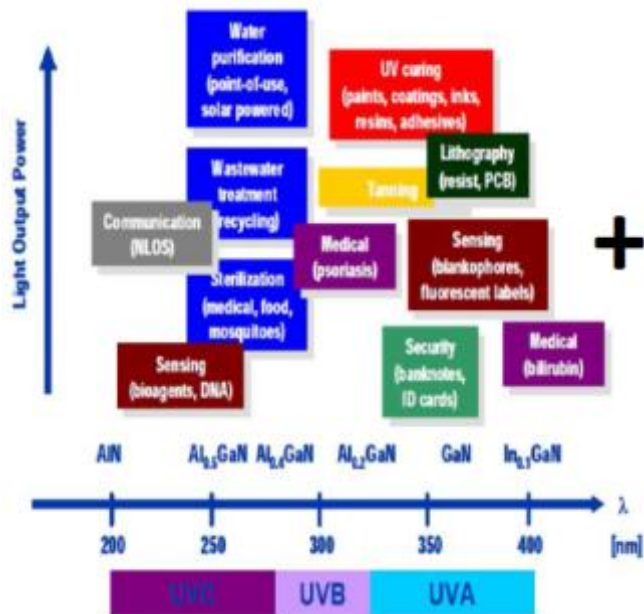

Daylight system with integrated Led lighting (Solatube)

- Combines smatly day & led-light
- Lowering energy cost
- Design for longevity by integration into buildings
- Insulation (W/m²K) in line with zero energy building stanadrds (Techcomlight)

Bron: Solatube & Techncomlight

Health lamp : light & air purifier

Source: luceinvento.it

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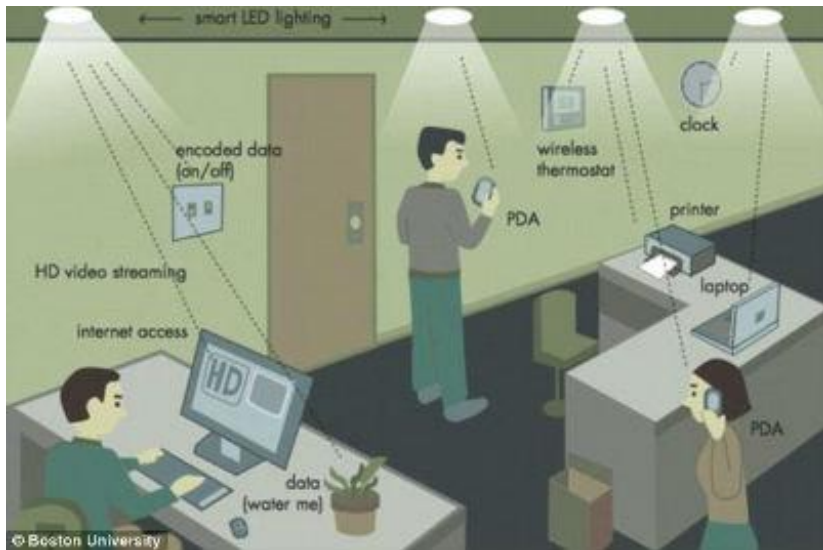
Li–Fi

Li–Fi tested in real world, 100 times faster than Wi–Fi

Image:BizLed (Boston University)

Image:Interrestingengineering.com

Solar energy Li–Fi technology that offers wireless communication solution for rural communities and developing regions ready for industry development

http://www.research–innovation.ed.ac.uk

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The interactive "Lightswarm"

The Lightswarm installation features urban sensors in a collection of 3D-printed modules with LEDs that respond to nearby noise by changing color.

Energy reduction

View from Mt. Wilson
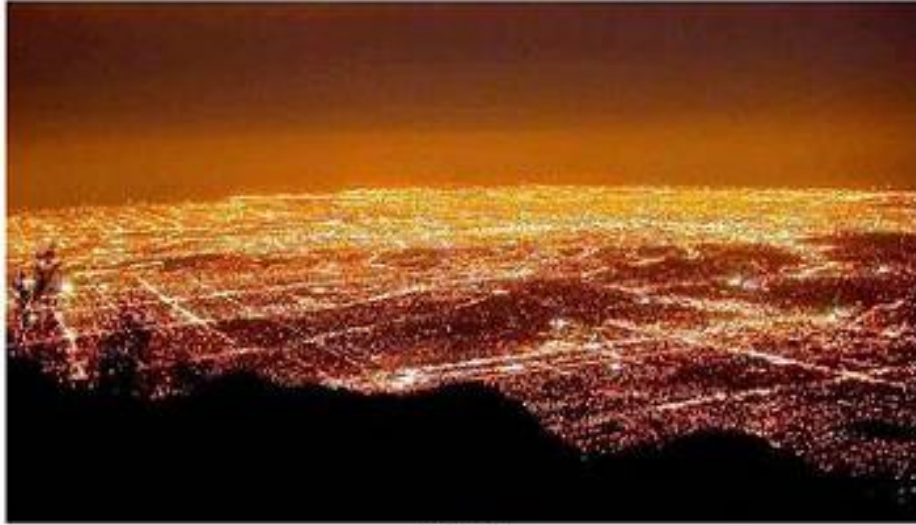
2002

2012

Image: LAWeekly

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Smart street lighting

- 3G/4G/Mobile networks
- Narrowband Satellite
- WiFi
- Existing IP networks

Management platform

Parking lots

Street lights

Electrical loads

Traffic lights

EV charging stations

PDA smartphones

IP cameras

Waste trucks

Water meters

Gas meters

Electricity meters

Dustbins

☐ Node — Narrowband full mesh networks   ☐ Gateway — Broadband full mesh networks
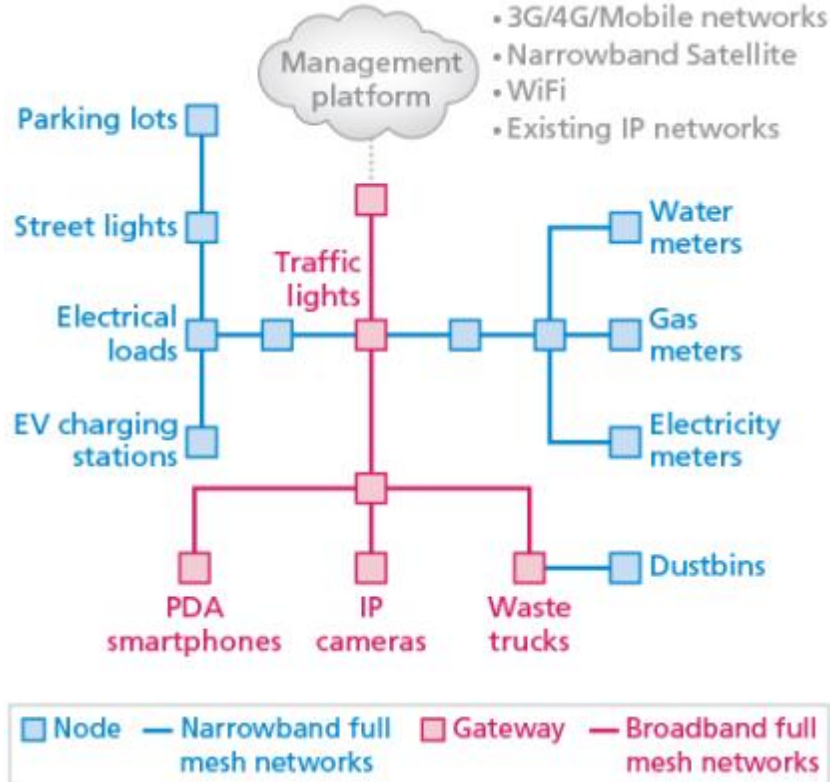
Image:ledsmagazine.com

Image:nozonsolar.com

What strategy to explore ?

Business volume

Open innovation

Design for well-being

Design for additional functional value

Design for product attachment & trust

Design for upgradebility and serviceability

Design for product durability

Design for ease maintenance & repair

Design for Dis- & reassembly

Design for Recycling

time

| Introduction | Growth | Maturity | Decline |

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Area's of influence as technology provider

Au , Ag
Image: lesker.com

REMs
Image: rainharvest.co.za

Raw Materials
Image: ckoemetals

Image: LCL LED

Image: TDS LIGHTING

Image: contentinjection.com

Product design

Product
Image: Riva

Service Design

Image: sentexlift

Image: BAC

Image: invezz.com

Image: wikipedia

Sociological systems

Image: Philips – Gizmag.com

Resource impact

Societal impact

Energy impact

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Where to start?   Where you feel comfortable

Explore motivation and drivers	**Explore strategy**	**Explore business model (BM)**	**Explore product & service design**	**Explore evaluation & validation**

What potential value can be found?

Personal engagement

Company engagement

On which domain can value be found over the life cycle?

How can BMs help to capture the value ?

What products and services can capture the value?

What did the experiment bring?

Image: cycLED.eu

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Experiment and create impact

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http://www.sirris.be

http://techniline.sirris.be

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http://www.linkedin.com/company/sirris

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