

Hospitality lighting solutions communication framework

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Hospitality Lighting Solutions Communication Framework

Anna Blanch Vergés
February, 2014



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EINDHOVEN UNIVERSITY OF TECHNOLOGY

Stan Ackermans Institute

SMART ENERGY BUILDINGS & CITIES

HOSPITALITY LIGHTING SOLUTIONS

COMMUNICATION FRAMEWORK

By

Anna Blanch Vergés

A dissertation submitted in partial fulfillment of
the requirements for the degree of
Professional Doctorate of Engineering

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This thesis has been established in collaboration with

3TU.School for Technological Design
STAN ACKERMANS INSTITUTE

TU/e Technische Universiteit
Eindhoven
University of Technology



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HOSPITALITY LIGHTING SOLUTIONS
COMMUNICATION FRAMEWORK

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ABSTRACT

Hospitality customers are looking for systems that involve more than just turning the light on and off. They want lighting solutions that are energy-efficient, flexible and that will help enhance the guest experience. Based on on-going research about the impact that light can have in different applications and an analysis of the European Hospitality market, specific total lighting solutions concepts are being developed to address these needs.

Therefore, as Philips is moving from a product provider to a total solution partner, there is a need to establish a new framework to communicate about these new positions in the market, also known as propositions. Propositions are a combination of several products, a range of controls and systems in an overall solution package. Although this framework is applicable to any segment within the Philips Lighting professional market group, in this assignment Hospitality has been selected as the carrier.

The first step was to translate the available Philips technologies portfolio into meaningful solutions for all relevant areas in a typical hotel. In parallel, an analysis of the end user profile and the related addressable market size was carried out to estimate the business opportunities. Last, the development of recommendations for new communication tools was made. These new tools aim to overcome the existing challenges that the sales force encounters when presenting total lighting solutions. These challenges are identified under the new solution consultative selling process framework, where the diverse Hospitality audience needs to be analyzed.

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1 INTRODUCTION

The company assignment object of this report is part of a ten-month cooperation between Eindhoven University of Technology and Royal Philips Electronics under the technological designer program Smart Energy for Buildings & Cities (SEB&C). This Professional Doctorate in Engineering (PDEng) program is offered by Stan Ackermans Institute 3TU.School for Technological Design and empowered by KIC InnoEnergy.

Stan Ackermans Institute (SAI) is a federation of three leading Dutch technical universities: TU Delft, TU Eindhoven, and University of Twente. The federation aims at maximizing innovation by concentrating the strengths in research, education and knowledge transfer of all technical universities in the Netherlands. The SAI manages twenty post-graduate technical designer programs across the three technical universities. Each designer program is intended to teach the design skills needed to design the complex systems needed in the high tech industry to new master's graduates who are starting in their careers.

SEB&C is also part of the KIC InnoEnergy educational program. KIC (Knowledge and Innovation Community) InnoEnergy is a European institute that fosters the integration of education, technology, business and entrepreneurship while strengthening the culture of innovation. The Consortium consists of more than 30 shareholders and over 50 additional partners such as companies, research institutes, universities and business schools. They are organised around six regional units, known as the Co-Location Centers: Alps Valleys, Benelux, Germany, Iberia, Poland Plus and Sweden.

The goal of a PDEng program is to provide an additional dimension to a full master's program by extending it and adding new elements to it. A PDEng student further develops skills for synthesis and interdisciplinary work, acquiring the competencies to create innovative technological solutions for products, processes, and systems. The solutions are based on functional requirements as well as on business and market requirements, within the context of society as a whole (attention for environment, safety, reuse, to name a few). The technological designer program takes two years to complete. During the first year extensive knowledge and experience of the latest design methods and their applications is gained. The second year of the program is spent in industry (Royal Philips Electronics in this case), where the PDEng trainee works on an individual assignment.

1.1 PROFESSIONAL DOCTORATE IN ENGINEERING SMART ENERGY BUILDINGS & CITIES

The Professional Doctorate in Engineering Smart Energy Buildings & Cities aligns with the concerns about the consumed energy, used materials, mobility needs and related CO₂ emissions in the built environment that have led to a growing interest in buildings and cities' sustainable development. Nowadays, numerous local and global initiatives around the world are taking place towards the development of more energy efficient buildings and cities. The ultimate goal of this theme is the creation of energy neutral cities with a minimum of CO₂ emissions, where people are actors of an urban context with environmental sustainability in a central role.

The SEB&C program focuses on the following topics:

- Intelligent and energy efficient building components,
- Building concepts aimed at the intelligent use of as less as possible energy,
- Energy generation in the built environment,
- Intelligent networks aimed at the alignment of supply and demand of energy,
- Investigation of strategic development for innovating companies in the field of energy and sustainability.

2 ROYAL PHILIPS ELECTRONICS

Royal Philips Electronics (designated as Philips from hereafter in this report) is a diversified Health and Well-Being company, focused on improving people’s lives through meaningful innovations. As a world leader in healthcare, lifestyle and lighting, Philips integrates technologies and design into people-centric solutions, based on fundamental customer insights and the brand promise of “innovation that matters to you”.

Headquartered in the Netherlands, Philips employs over 118,000 employees with sales and services in more than 100 countries worldwide as shown in Figure 2.1. With sales of EUR 24.7 billion in 2012, the company is a market leader in cardiac care, acute care and home healthcare, energy efficient lighting solutions and new lighting applications, as well as lifestyle products for personal well-being and pleasure with strong leadership positions in male shaving and grooming, portable entertainment and oral healthcare (source: Philips Annual Report 2012).

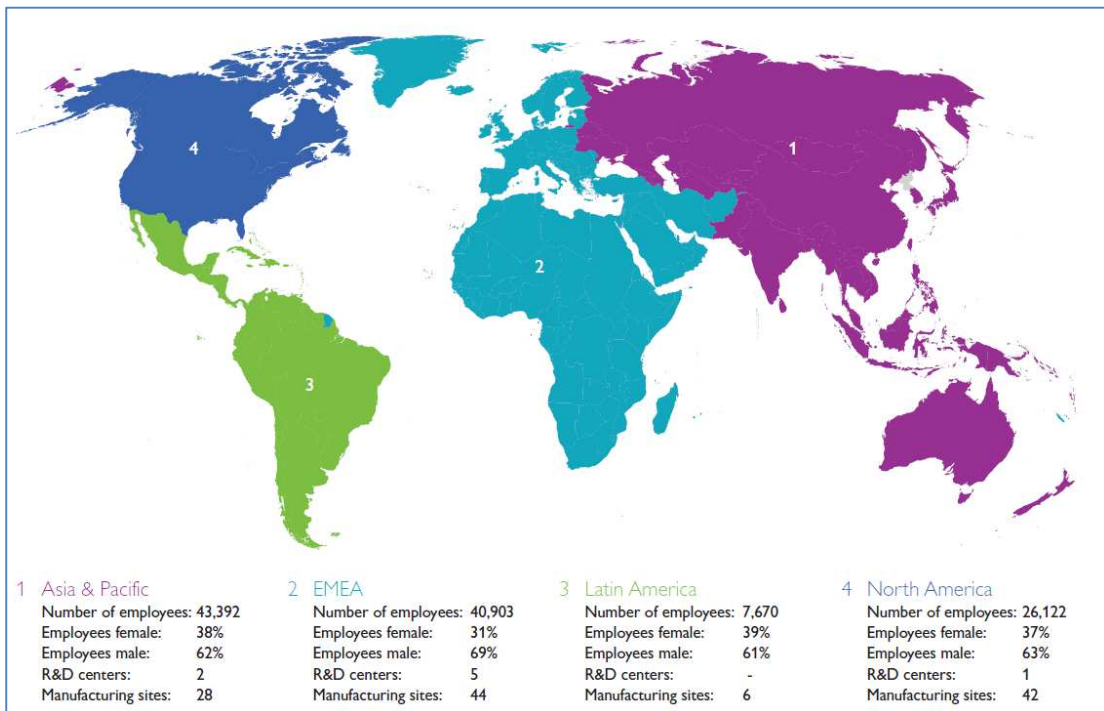


FIGURE 2.1 PHILIPS EMPLOYEES AROUND THE WORLD

The number of registered patents (approximately 1,500 only in 2012) illustrates the innovative nature of the company. Philips currently holds around 36,000 registered trademarks, 63,000 design rights and 3,900 domain names. Philips has adopted an Open Innovation strategy which leverages the joint innovative power of partnering companies and researchers to bring more innovations to the market effectively and faster. In 2012, Philips invested EUR1.8 billion in Research and Development.

Philips Lighting is the leading provider of lighting solutions and applications both for professional and consumer markets, pioneering on how lighting is used to enhance the human experience in the places where people live and work. Whether at home, on the

road, in the city, shopping, at work or at school, Philips Lighting is creating lighting solutions that transform environments, create experiences, and help shape identities. Philips Lighting serves its customers through a market segment approach which encompasses Homes, Office and Outdoor, Industry, Retail, Hospitality, Entertainment, Healthcare and Automotive. For these segments Philips Lighting provides a wide range of offerings from across the entire lighting value chain - from light sources, luminaires and lighting controls to lighting solutions and services. Philips Lighting employs approximately 53,000 people worldwide.

Philips simplifies **Healthcare** by focusing on the people in the care cycle – patients and care providers. Through combining human insights and clinical expertise, Philips aim to improve patient outcomes while lowering the burden on the healthcare system. Advanced healthcare solutions are a fundamental part of the portfolio for both healthcare professionals and consumers, to meet the needs of patients in hospitals and at home. Philips Healthcare employs approximately 35,500 people worldwide.

Guided by the brand promise of ‘innovation and you’ and the consumer insights, **Philips Consumer Lifestyle** offers rich, new consumer experiences that meet consumers’ desire for relaxation and improving their state of mind. Philips also responds to the consumer’s desire for wellness and pleasure by introducing products that meet the individual’s interests in terms of their body and appearance. Philips Consumer Lifestyle employs approximately 17,700 people worldwide.

Sustainability is at the center of Philips’ strategy. Philips is committed to reducing its environmental footprint in all aspects of its business: in its products, manufacturing, and procurement, as well as in the communities where the company acts and in the working practices of its employees. All Philips products go through an EcoDesign process, identifying environmental impact in terms of energy efficiency, hazardous substances, take-back and recycling, weight, and lifetime reliability. Philips’ processes on Green Product sales are verified annually by an independent third party and published in the Annual Report. Philips aims to combat global healthcare challenges by focusing on delivering better quality healthcare at lower costs, also in the emerging markets, such as China and India. Philips also takes a leading position in educational programs, showing its stakeholders that energy efficient solutions are simple, easy and actionable and make economic sense for national and local governments, businesses, schools and individuals.

2.1 PHILIPS LIGHTING

Philips Lighting is a global market leader with recognized expertise in the development, manufacturing and application of innovative lighting solutions. Philips Lighting has pioneered many of the key breakthroughs in lighting over the past 121 years and spans the entire lighting value chain – from light sources, luminaires, electronics and controls to full applications and solutions – through the following businesses (also shown in Figure 2.2):

- **Light Sources & Electronics:** LED, eco-halogen, (compact) fluorescent, high-intensity discharge and incandescent light sources, plus electronic and electromagnetic gear, modules and drivers;
- **Consumer Luminaires:** Functional, decorative, lifestyle and scene-setting luminaires;
- **Professional Lighting Solutions:** Controls and luminaires for city beautification, road lighting, sports lighting, office lighting, retail and hospitality lighting and industry lighting;
- **Automotive Lighting:** Car headlights, car signaling and interior;
- **Lumileds:** Packaged LEDs.

The Light Sources & Electronics side of business conducts its sales and marketing activities through the professional, OEM and consumer channels, the latter also being used by Philips' Consumer Luminaires business. Professional Lighting Solutions is organized in a trade business (commodity products for wholesalers) and a project solutions business (project luminaires, systems and services). Automotive Lighting is organized in two businesses: OEM and After-market.

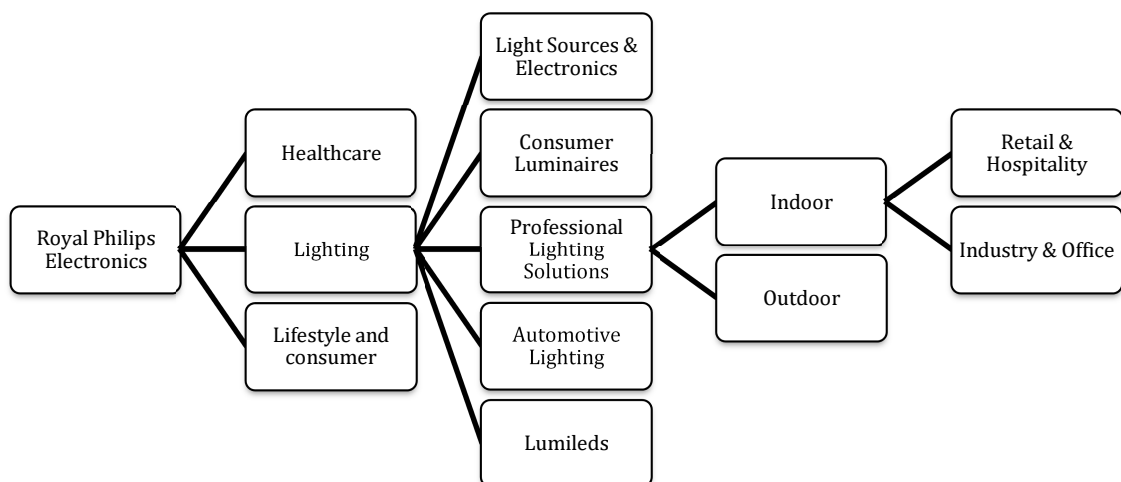


FIGURE 2.2 PHILIPS LIGHTING BUSINESSES

The conventional lamps industry is highly consolidated, with GE and Siemens/Osram as key competitors. The LED lighting market, on the other hand, features a wide variety of competitors, ranging from start-up companies to multinationals. The luminaires industry is fragmented, with Philips' competition varying per region and per market

segment. Philips Lighting has manufacturing facilities in some 25 countries in all regions of the world, and sales organizations in more than 60 countries. Commercial activities in other countries are handled via distributors working with Philips International Sales organization. Lighting has 50,200 employees worldwide.

As shown in Figure 2.3 , the Light Sources & Electronics business accounts for half of the total sales in 2012. The second largest in sales is the Professional Lighting Solutions business.

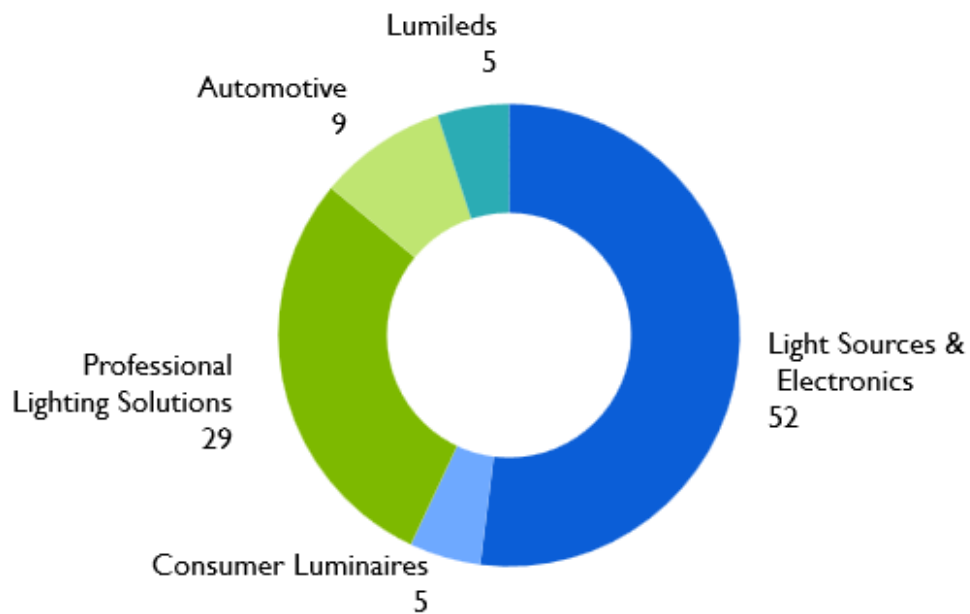


FIGURE 2.3 TOTAL SALES IN % BY BUSINESS 2012 (SOURCE: PHILIPS ANNUAL REPORT 2012)

Philips provides flexible lighting solutions for the Hospitality market segment through the **Professional Lighting Solutions business**.

3 ASSIGNMENT DEFINITION

3.1 SITUATION

Hospitality customers (for example, hotel managers) are looking for lighting systems that involve more than just turning the light on and off. They want a solution that is energy-efficient, flexible, easy to use, and that will help enhance the guest experience. The goal of this company assignment is to develop a Hospitality solutions' communication framework based on a customer-driven approach and a European market analysis.

3.2 RATIONALE

Since its creation in 1891, Philips has been a product-oriented company, selling thousands of conventional lighting products as incandescent, halogen and fluorescent technology bulbs around the world. However, new technologies, such as light emitting diode (LED) devices, have completely changed the market and, therefore, the business strategy. Since LED diodes are essentially a product from the semiconductor (chips) industry, new entrants are coming to the lighting market, and lighting installations are expected to become more intelligent, dynamic and personalized.

To overcome these challenges, Philips is transforming from being a largely product-focused company to a solution oriented company in which products are seen as building blocks.

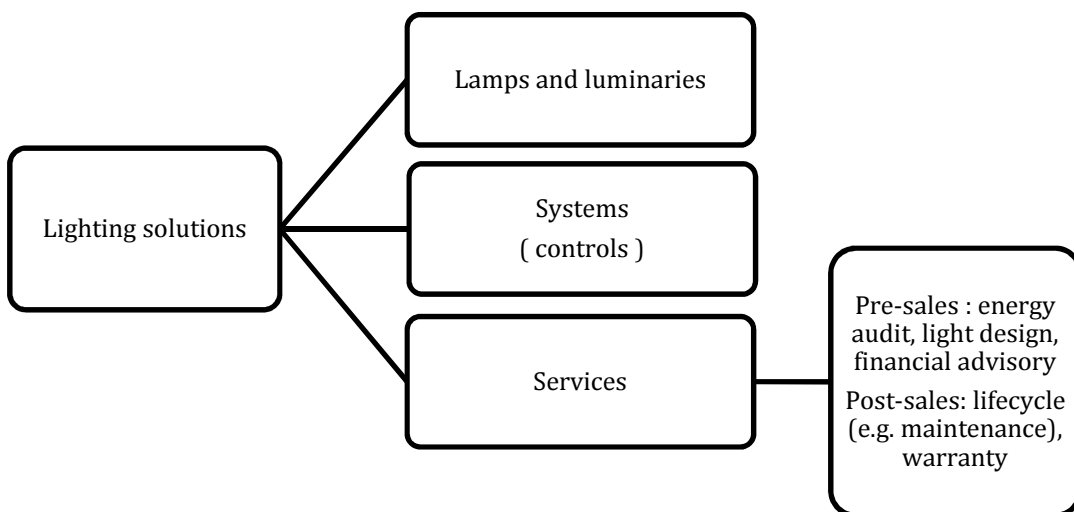


FIGURE 3.1 PHILIPS LIGHTING ORGANIZATION

However, the main issue in the transformation from products to solutions is that Philips is relatively new to the system and services market and not yet recognized as being a major player in this market. To be able to offer systems and services, it is important to have a strong relationship with key customers that will lead to higher revenue streams. The advantage is that Philips already has built these relationships during its operation history.

Based on on-going research about the impact that light can have in different sectors, specific total lighting solutions concepts are being developed to address these needs. Therefore, as Philips is moving from a product provider to a total solution partner, there is a need to establish a new framework to communicate about these new offers to the market, also known as propositions.

Propositions are a combination of several products, range of controls and systems in an overall solution package. Although this framework is applicable to any segment within the Philips Lighting professional business group, in this assignment Hospitality has been selected as the carrier. The main advantage is that within Hospitality there is a broad pallet of applications (e.g., lobby, meeting rooms, guest rooms and corridors).

Next to describing the goal of this assignment, it is also very important to identify the motivations behind it. The first reason is that several markets and clusters such as Spain, Nordics and Central East Europe have stated their interest and have required support in the first phases of the solutions sales process. However, within the existing offline and online available Hospitality communication tools (explained in chapter 8), there is no dedicated material to reach and inspire the so-called creative specifiers target group. The second reason is that although Philips departments like ColorKinetics, Dynalite and LED lamps (part of LS&E) are developing Hospitality projects and looking into the opportunities in the Hospitality market, there is no integrated approach.

Moving towards a solution consultative selling process, it starts by identifying the target audiences and its problems. Only after this, the key messages on how Philips lighting solutions can solve these problems can be articulated. In the Hospitality sector, a very diverse audience including general managers, facility managers, architects, (lighting) designers and brand managers is analysed (explained in chapter 7) to understand the outside-in problem statement. It is also necessary to map the present situation in order to understand where the Philips Lighting organization currently stands and where managers want to take it (from a product towards a solution oriented company). And also, the challenges that the Philips sales force encounters when presenting to customers need to be considered.

3.3 CHALLENGE AND SOLUTION

The challenge is to overcome the existing barriers that Philips sales force encounters when presenting total lighting solutions to Hospitality customers.

Therefore, the solution will be based in creating a framework that includes a set of internal and external communication tools to overcome these challenges. These tools should:

- Communicate the effects of technology in terms of end-user benefits
- Communicate on rational as well as emotional level
- Communicate integrated solutions rather than components or just one element of solution
- Communicate complexity of options in a simple way
- Communicate in non-technical terms that are relevant to the end-user
- Include supporting and structured documentation to communicate on a technical level
- Include different communication tools for different audiences
- Match communication tools to stages in the AIDAR (Attention, Interest, Desire, Action and Retention) buying process
- Be intuitive and easy to use
- Enable and stimulate cross-selling of various lighting technologies
- Ensure that tools can be used per area and/or for the whole hotel

The carrier for this assignment is the hotel segment. The total lighting solutions for hotels should:

- Include all relevant Philips technologies in overall solutions (also known as propositions)
- Include all relevant hotel areas (guest rooms, lobbies, bars, restaurants, car parks, back of house areas, corridors, meeting and ball rooms, façades and wellness areas)
- Integrate energy efficient lamps, luminaires and controls

The first step, as shown in Figure 3.2, is to translate the Philips portfolio of available technologies into meaningful solutions for all relevant areas in a typical hotel. In parallel, it is needed to analyze the end-user profile and the related addressable market size to realize about the business opportunities that will meet the needs and wishes of the Hospitality customers. This will be the basis to develop a communication plan and a set of internal and external tools that will form the communication framework.

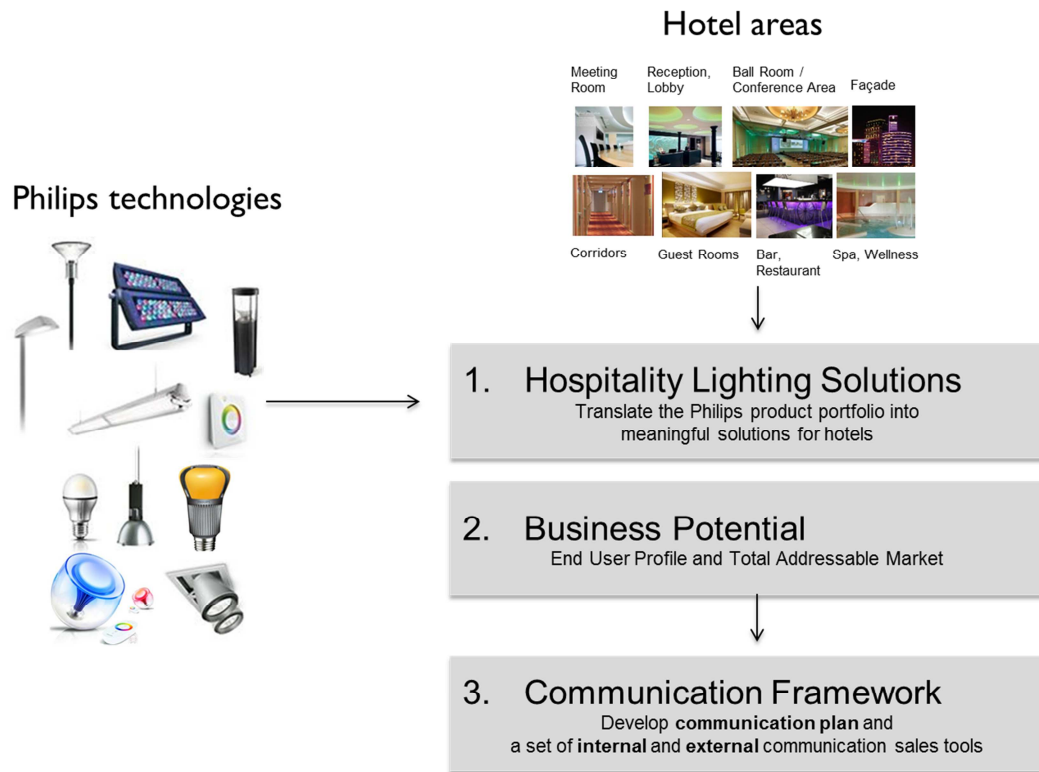


FIGURE 3.2 STEPS TO DEVELOP HOSPITALITY COMMUNICATION FRAMEWORK

4 PROBLEM STATEMENT AND CONTEXT

This chapter is divided into two sections: a description of the Hospitality context, which can be understood as an evaluation of the outside-in situation; and the inside-out problem statement by internal Philips stakeholders related to the Hospitality business.

4.1 OUTSIDE-IN PROBLEM STATEMENT

4.1.1 HOSPITALITY CONTEXT

Location still remains the primary factor that determines hotel choice with a 30% role in the decision-making process for the consumer[1]. “Price” and “Past Experience” are the next most important factors in hotel selection. But also, special hotel services, friend's recommendations and the brand's reputation play a bigger role in hotel selection.

The Hospitality solutions identified during the development of this assignment aim to:

Impact on guest satisfaction and revenue to:

1. Increase occupancy rates,
2. Increase return visits, and
3. Differentiate the brand of a hotel.

Reduce in lighting and energy consumption to:

1. Reduce energy and maintenance costs,
2. Be competitive, and
3. Protect the environment.

The dynamic and fast-growing hotel sector is one of the highest consumers of energy resources in the non-residential building sector, representing some 9% of total energy consumption in the commercial buildings sector [2].

Variation in energy use levels in European hotels depends on physical and operational parameters of each building. **Physical parameters** include size, age, structure and design of the building, geographical and climate location, and type of energy and water systems installed. **Operational parameters** include operating schedules for different functional facilities, services offered, occupancy levels, guest's indoor comfort preferences, energy rates, and on-site conservation practices.

Combining data from various studies, the Hotel Energy Solutions project[3] states that average energy use by hotels is in the range 305-330 kWh/m²/year. In the same report, the following benchmarks shown in Table 4.1 have been set.

	kWh/m²/year
Excellent	< 195
Good	195 to 280
Average	280 to 355
Poor	355 to 450
Very poor	> 450

TABLE 4.1 BENCHMARK AVERAGE ENERGY USE BY HOTELS

The main energy consuming activities in a hotel are:

- heating and cooling rooms,
- hot water use,
- lighting,
- preparing meals (especially warm ones), and
- heating of the swimming pool.

In the hotel sector two types of energy are used: thermal energy and electricity[4]. In both cases, it is desirable to have an efficient use of energy. Space conditioning (heating/cooling, ventilation and air-conditioning) is the largest use of energy (thermal) in hotels, accounting for approximately half of the total consumption. The second largest user is domestic hot water (thermal). Lighting (electricity), which can fluctuate a lot from one hotel to another, is typically the third largest use. Very common services in hotels like laundry, catering, sports and health facilities also account for a considerable share of the total energy consumption.

As an example, the results over detailed energy surveys among 50 hotels in England are shown in Figure 4.1. This analysis indicates that although lighting accounts for only 8% of the total energy use, when translated to the energy by cost, it reaches 21%. Additionally, conventional lighting also has high related maintenance costs because of its limited lifetime compared to LED lighting.

Energy prices have a considerable impact on the hotel sector, as energy generally makes up the largest portion of hotel operational cost after the cost of staff. Consumption is also highly influenced by the source of energy, depending on the local energy policies.

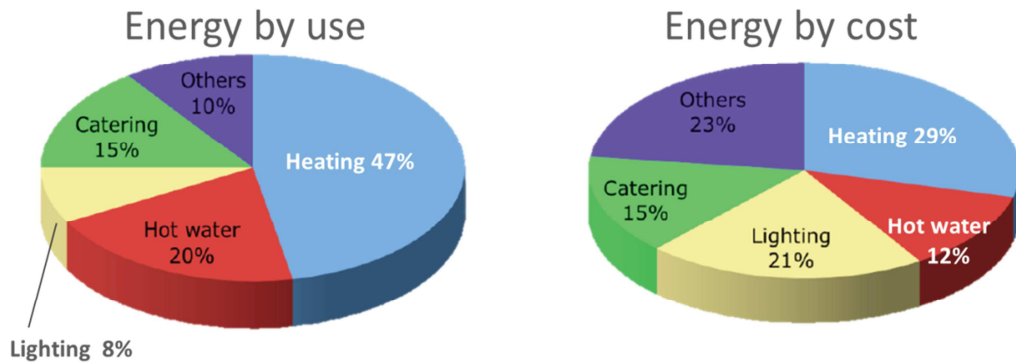


FIGURE 4.1 ANALYSIS OVER 50 ENERGY SURVEYS OF HOTELS IN ENGLAND [4]

Energy use in most buildings is known to be highly inefficient, with large heat losses through poor insulation (walls, roofs, windows and heating pipes), poor management of lighting, and design features that necessitate excessive energy use for both heating and cooling[5]. Hotels can reduce their operations costs by adopting practical strategies such as upgrading or replacing outdated heating, ventilation and air conditioning systems. However, this can require a deep renovation. By installing new energy efficient lighting and control technologies, it becomes possible to reduce both the amount of electricity and energy costs.

The guestrooms, the center of any guest experience, represent around 70% of the space in a hotel. As part of this assignment, a detailed analysis of the guest rooms' energy saving measures that Philips Lighting can help Hospitality customers achieve has been conducted in Chapter 6.

- **Energy efficient lighting**

Lighting is one of the costliest areas of electrical energy consumption in hotels. The lighting levels necessary for each hotel area are determined (partly) by the lighting regulations of the particular country; these levels should be reached by using the most appropriate lighting for each application. The energy savings associated to retrofit projects, where conventional lighting is replaced for LED lighting, depend on the installed power of the conventional system. For reference purposes, **conventional installed power is 10-20 W/m² for guest rooms and 15-30 W/m² for general service areas**, giving a total energy consumption of 25-55 kWh/m² per year[6]. In general, the energy savings can vary between 20% and 80% depending on the conventional lighting technology (incandescent, halogen or compact fluorescent lamps). In hotel areas, where typically a combination of halogen and compact florescent lamps are found, a **35% on energy savings when replacing to LED is assumed**.

In the Scarlet hotel in London (United Kingdom), the design by Philips Dynalite Dimension dealer, Lightmaster-Direct, embraces best environmental practices to yield a lighting scheme in harmony with the surroundings using just 3.36 W/m².

- **Lighting controls**

By using lighting controls it is possible to only light areas that are occupied or truly need light. This is possible using technical measures like key card integration or movement sensors (to switch off electricity when guest rooms are vacated) **which can save energy up to 10%**.

- **Regulation of space heating and cooling**

As mentioned above, space heating and cooling is generally the largest source of thermal energy consumption. To reduce this consumption it is necessary to regulate the temperature of the different zones according to its actual needs and occupancy. Two main solution categories have been identified:

- Implement **HVAC close control for individual rooms**. Close control allows the reduction of the level of air conditioning when a room is not occupied, keeping the temperature at a standby level so that it can be quickly restored to normal when needed. Automatic devices may also be used to switch off air conditioning and/or heating when windows or external doors are opened. Autonomous control systems can save energy up to **20-30%**.
- Install **individual thermostatic controls** in guest rooms, with proper upper and lower limits for temperature settings. Individual thermostatic controls in guest rooms can save energy up to **10-20%** on space heating.
- Higher savings can be achieved controlling the temperature in the guest rooms via a Building Management System (BMS) or Property Management System (PMS). Integration with BMS or PMS is only possible when using network-capable control systems.

4.1.2 *ECO-LABELS AND CERTIFICATIONS*

Various initiatives have been developed to support hotels to improve their environmental performance, particularly through reducing use of energy and water resources, generation of wastes and promoting the use of renewable energies. These include Environmental Management Systems and Environmental Management Standards and a variety of eco-labels or eco-certificates (i.e., *BREEAM* and *LEED*). Currently, over 100 eco-labels and certification schemes are available for tourism, ecotourism and the Hospitality industry worldwide. Among them, some examples include the *GreenKey* or the *iStayGreen*. Europe alone has over 60 labeling schemes.



FIGURE 4.2 EXAMPLES OF ECO-LABELS IN THE HOTEL INDUSTRY

For businesses in the tourism and leisure industry and in the market of meeting and conference locations, there is a large number of standards that certify locations that are seriously involved with sustainability and care for the environment of the company. Hotels within certification programs feature a number of elements that focus on water efficiency, recycling, and energy. A LED lighting system highly influences in the energy category (see Table 4.2 and Table 4.3.), and therefore, in the achievement of the certification. But also, there is a large number of websites with an eye on “green” hotels (*iStayGreen*, *Tripadvisor*) and with more and more travelers booking their travel online, becoming green opens up numerous online marketing channels that can help attract a growing population of eco-conscious customers. This is also reflected in an emerging market trend: business travelers are asking for the carbon footprint report of their stay. For example, the Hilton LightStay Meeting Calculator tool computes the sustainability impact of meetings or events at their properties[7].

BREEAM (Building Research Establishment’s Environmental Assessment Method) certifications are available for new construction or existing hotels and depend on a 100-point scoring system. There are nine different categories in which a hotel has the opportunity to earn points and lighting affects in three of them as shown in Table 4.2.

Land Use & Ecology	10%
Water	6%
Energy	19%
Materials	12.5%
Health & Wellbeing	15%
Transport	8%
Waste	7.5%
Pollution	10%
Management	12%
Total	100%

TABLE 4.2 BREEAM CERTIFICATION CATEGORIES

LEED (Leadership in Energy and Environmental Design) certifications are available for new construction or existing hotels and depend on a 100-point scoring system. There are seven different categories in which a hotel has the opportunity to earn points and lighting affects in four of them as shown in Table 4.3.

Sustainable Sites	23.6%
Water Efficiency	9.1%
Energy & Atmosphere	31.9%
Materials & resources	12.5%
Indoor Environmental Quality	13.6%
Innovation in Operations	5.5%
Regional Bonus Points	73.6%
Total	100%

TABLE 4.3 LEED CERTIFICATION CATEGORIES

4.2 INSIDE-OUT PROBLEM STATEMENT

To understand the **challenges** and **needs** around the Hospitality business segment, the following internal Philips stakeholders were interviewed during the first two months of the development of this assignment (March and April 2013):

- Business Development Managers
- Marketing Managers
- Application Engineers
- Product Managers
- Marketing Communication Managers

From the information obtained during the interviews, the main **challenges** with regard to the understanding of total lighting solutions are:

- Philips sales force can be uncomfortable presenting controls (intelligence);
- Hospitality propositions are often highly technical, not inspirational;
- Hospitality propositions are often phrased in Philips terms rather than customer terms;
- Customers are not aware of Philips' abilities, options and solutions; and
- Appropriate discussion partners are not interested in Philips-centered techno-talk.

And among the different answers, four main **needs** have been identified:

- Create tools that educate the customers. Give tips and tricks, i.e., why there is a need of shifting to LED lighting? Explain concepts: color temperature, ambiance possibilities, lux levels and beam angles.
- Establish fluent conversation with creative specifiers. Support the sales pitch with renderings and visual material to inspire them. Personalization is a very strong way to win over customers. Therefore, a photo-based tool could be very powerful.
- Communicate solutions rather than products: i.e., by showing the possibility of choosing from different scenes, the customer understands that a full solution is offered.
- Have the appropriate solution portfolio and learn how to present it: Hospitality case studies are basic; the architects want to see how it looks with more details, more images and visualizations of the result. No need to show pictures of the products, creative specifiers use the online catalogue.

These results were presented back to the interviewed people in order to validate them. Their needs are taken into account to develop the communication framework which is the goal of this report.

5 SOLUTIONS BY AREAS

When looking into the functionalities and demands of each area in a typical hotel, three main solution categories have been identified. For car parks, back of house areas, corridors and functional meeting rooms the main need is to **achieve energy savings through a functional lighting solution**. In guest rooms, lobbies, bars, restaurants, ball rooms and conference areas, energy savings is not the only issue, since the creation of comfortable atmospheres **through an ambience lighting solution** is also key. Façades and large wellness areas demand a full architectural lighting solution to achieve **brand recognition and guest's mood creation**. In Figure 5.1 these three categories are visualized. Taking these three main categories into account, solutions for each area have been developed.

The following discussion focuses on 3, 4 and 5 stars hotels. This choice of segmentation will be explained in Chapter 7. Of course not every hotel will apply these solutions to the same extent. Therefore, we will later look at a set of options or propositions per area. In Chapter 6, three levels of solutions for guestrooms are developed.



FIGURE 5.1 FUNCTIONAL, AMBIENCE AND ARCHITECTURAL LIGHTING SOLUTION CATEGORIES

In this chapter, a description per area and its functionalities is given. Also, the required levels of light according to the EN 12464-1 application standard are shown in a table. The standard doesn't provide specific solutions, nor does it restrict the designer's freedom for exploring new techniques.

The illumination can be provided by daylight, artificial lighting or a combination of both. Four criteria are specified for each application:

- Minimum required average illuminance (E_m) per task.
- Minimum required colour rendering (R_a). In rooms where people need to work or stay for longer periods, lamps with a R_a of at least 80 are required.
- Maximum Unified Glare Rating (UGR_L) is an approximate model that expresses the chance of direct glare by luminaires. The higher this figure, the greater the chance of glare.
- Uniformity required (U_0).

5.1 RECEPTION AND LOBBY

It is the lobby that shapes a guest's first impression of a hotel premises. The design of the lobby and the reception should attract the attention of guests and immediately feel good. Also, the design of this area should reflect a hotel specific brand identity, while providing comfort and guidance. Lighting plays a key role in determining what those first impressions are. Because efficient communication at a reception can sometimes be a very complex task, the quality of the lighting in these areas is of crucial importance.



FIGURE 5.2 CORINTHIA HOTEL IN LISBON, PORTUGAL (LEFT)
AND RAFAYEL HOTEL IN LONDON, UNITED KINGDOM (RIGHT)

- **Lobby**
Artificial lighting should help to give structure to the hotel lobby and help guests distinguish active zones from the relaxation areas. Thus, the lobby should help orient guests to the overall facilities available. Good conditions for visual perception help to give the guest a greater sense of confidence, well-being and safety.
- **Reception**
The brightness of surfaces in this area should be higher than those in the surrounding area, which makes the reception desk stand out. Lighting should also emphasize the status of the reception. Guests and staff need to be able to see one another clearly; this helps create confidence for all parties. Distracting reflections or uncomfortable glare from the counter can be eliminated by ensuring that lighting is predominantly indirect or that critical angles of light incidence are avoided. Illumination of the background of the counter is of crucial importance for good visibility of people.

Functionalities

- LED lighting allows the reduction of the energy costs involved with 24/7 lighting, without compromising either the atmosphere or the quality of light and reducing the maintenance costs. In these areas, current installations are mostly halogen bulbs.

- Creating the right ambience for welcoming guests. Depending on the occasion, individual scenes can be pre-programmed and selected at the touch of a button.
- The system can also automatically run on a schedule to ensure the right welcoming lighting scenes throughout the day and save additional energy.

Required levels of light

In Table 5.1 Required levels of light in reception and lobby, the required levels of light in receptions and lobbies according to the EN 12464-1 are given.

Norm EN 12464-1 requirements	E_m (lux)	UGR_L	U_0	R_a	Specific requirement
Entrance hall	>100	<22	>0.40	>80	URG only if applicable
Reception/cashier desk, porters desk	>300	<22	>0.60	>80	

TABLE 5.1 REQUIRED LEVELS OF LIGHT IN RECEPTION AND LOBBY

Lighting design

In Figure 5.3, a sample floor plan of a full lighting design of a reception and lobby is shown. At the bottom of the figure, the luminaires, lamps and controls used for the design are listed.

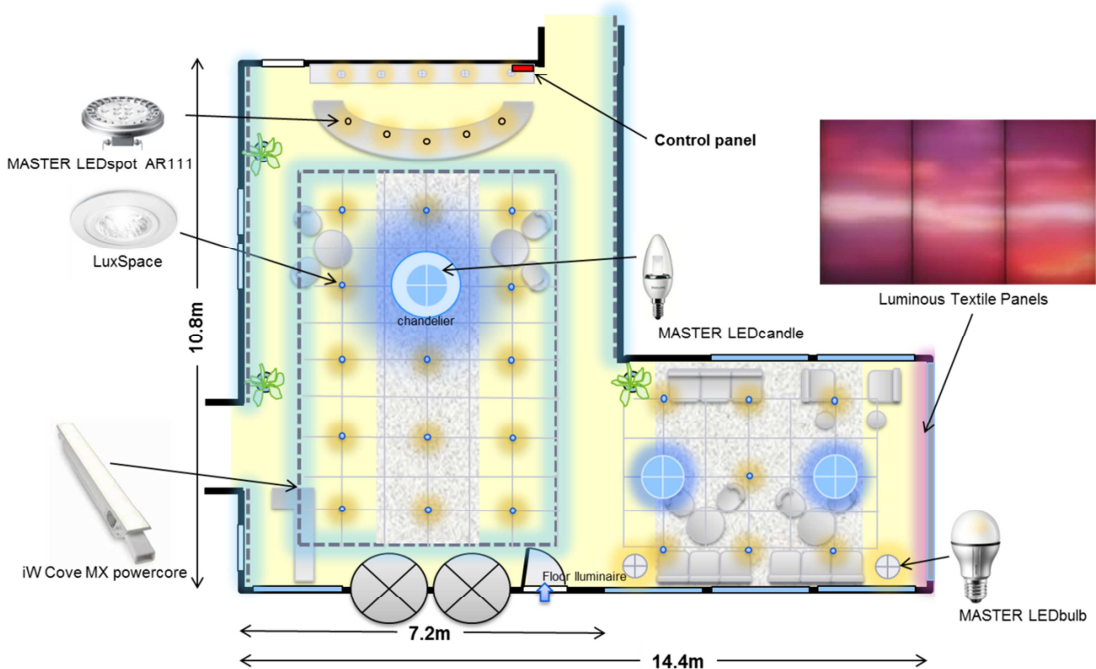


FIGURE 5.3 EXAMPLE OF LIGHT PLAN OF RECEPTION AND LOBBY

5.2 CORRIDORS AND OTHER AREAS OF TRANSITION

Corridors and other transition areas like stairs and elevators are primarily circulating areas, in which the need for guidance and security comes first. Because these areas are almost always also escape routes, emergency lighting should be installed. Circulation areas are those in which easy communication also takes place. By creating the right ambience it can be transformed into spacious and communication friendly areas.



FIGURE 5.4 HILTON HOTEL IN AMSTERDAM, THE NETHERLANDS

- **Corridors**

In hotel corridors, guestroom entrance doors, and especially the keyhole and room number, should be highly visible. Long corridors can be optically shortened by integrating points of intense light and a higher ceiling height impression can be obtained by directing sufficient light to the ceiling. Illuminated walls will reflect light and also raise the level of safety and create better guidance.

- **Staircases**

Staircases are always integrated in the escape routes. Therefore, no-glare emergency lighting must be installed. The use of low-reflectance surfaces, such as dark carpets or stone steps, calls for higher lighting levels.

- **Elevators**

Raising the level of brightness in the elevator entrance areas should automatically guide guests to it. Inside the elevators lighting should be diffuse to avoid harsh, distorting shadows.

Functionalities

- LED lighting – with low energy and maintenance costs. In these areas, current installations are mostly fluorescent and energy saving bulbs.
- In corridors, occupancy control is crucial for achieving significant energy savings. There are quick and easy-to-install intelligent solutions that detect the

slightest movement. These solutions work with any luminaire or lamp that dim back into an energy-saving mode when no one is around.

- Dimming possibilities, instead of entirely switching off the lighting, provide comfort and safety. People don't like to step into a bright corridor at night and prefer a bright corridor during daytime.
- Networked (daylight harvesting) solutions can also dim the lighting when natural light is available and increase the lighting levels when natural levels drop, such as bad weather or through winter months.

Required levels of light

In Table 5.2, the required levels of light in corridors according to the EN 12464-1 are given.

Norm EN 12464-1 requirements	E_m (lux)	UGR_L	U_0	R_a	Specific requirement
Corridor	>100	<25	>0.40	>80	During night-time lower levels are acceptable

TABLE 5.2 REQUIRED LEVELS OF LIGHT IN CORRIDORS

Lighting design

In Figure 5.5, a sample floor plan of a full lighting design of a corridor is shown. At the bottom of the figure, the luminaires, lamps and controls used for the design are listed.

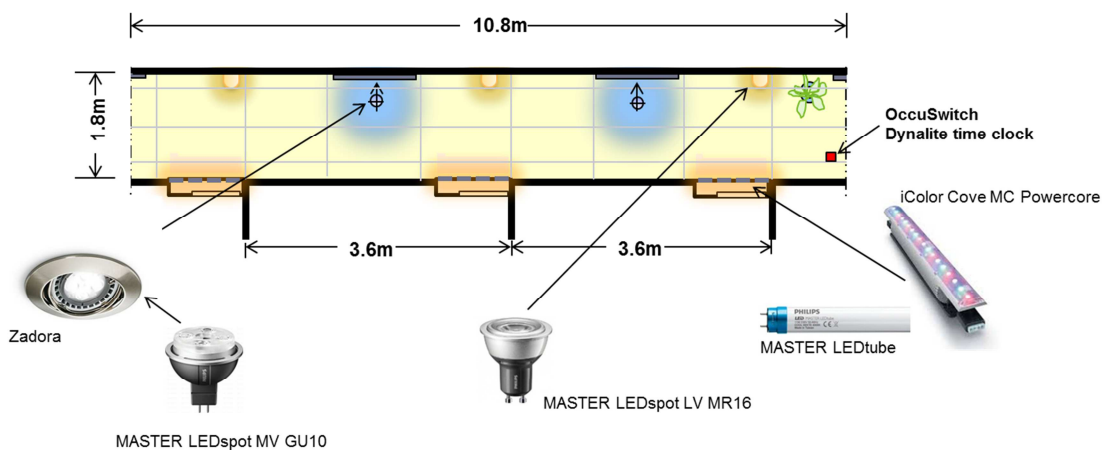


FIGURE 5.5 EXAMPLE OF LIGHT PLAN OF CORRIDOR

5.3 GUESTROOMS

The majority of hotel guests use their rooms mainly in the evening and at night, so lighting plays a particularly important role here. Business travelers may spend time working, watching TV, and relaxing at night. But other groups of travelers like family travelers or women travelling alone have different needs and wishes that have to be considered. Therefore, flexibility in the guestrooms is highly important. Lighting design for guest rooms should be geared primarily to the need for ambience and comfort, which in lighting terms means the use of luminaires that are individually switchable and that can be regulated to the ambience that fits best to the different room activities.

A more detailed explanation of the lighting propositions developed for the guestrooms is given in Chapter 6. Since guestrooms represent on average 70% of a hotel space and is also where guests spend the majority of their stay, a more detailed analysis is needed.



FIGURE 5.6 NH HOTELES EUROBUILDING IN MADRID, SPAIN

- **Living space**

Guests should be able to select the level and distribution of brightness in the room to suit their activity and mood. For this reason alone, individual dimming and scene setting is recommended for regulating lighting levels. Convenience increases by installing user control panels at the entrance to the room and also at the bed side (e.g., a master switch to turn off all the lights in the room at the same time).

- **Bathroom**

Bathroom lighting needs to be possibly bright and fresh in the morning and warm and cozy in the evening. For humid and wet zones, luminaires with the right degrees of protection are required. Mirror lighting should be diffuse and illuminate the guest's face without creating unnatural shadows.

Functionalities

Improve guest satisfaction and comfort

- Long lifetime LED lights – reduction of number of broken bulbs in the guest room. The current situation in a lot of hotels is that daily checking rounds to identify broken bulbs are necessary in order to avoid negative guest experiences. In these areas, current lighting installations are mostly a mix of halogen and CFL.
- Light scenes selection provided by ease of use interfaces: all lights on, daytime, nighttime or all lights off.

Reduce energy and lighting consumption

- LED lighting – with low energy and maintenance costs.
- The implementation of a guest room control system can manage lighting, blinds, heating and air conditioning.
- The integration of a card holder system actuator ensures that only occupied rooms consume energy from lighting, heating, air conditioning, radio and television.

Required levels of light

In guest rooms, as shown in Table 5.3, there are no required levels of light according to the EN 12464-1 norm.

Norm EN 12464-1 requirements	E_m (lux)	UGR_L	U₀	R_a	Specific requirement
guestroom	-	-	-	-	No requirements

TABLE 5.3 REQUIRED LEVELS OF LIGHT IN GUESTROOMS

Lighting design

In Figure 5.7, a sample floor plan of a full lighting design of a guestroom is shown. At the bottom of the figure, the luminaires, lamps and controls used for the design are listed.

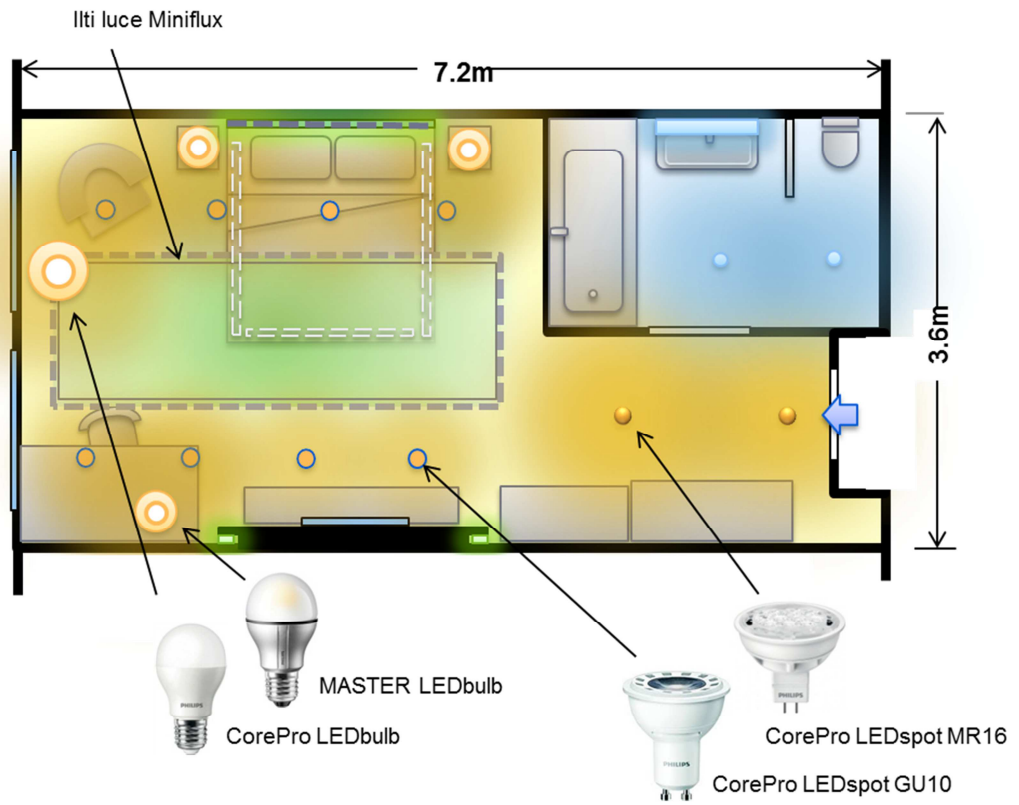


FIGURE 5.7 EXAMPLE OF LIGHT PLAN OF GUESTROOM

5.4 LUXURY ROOMS AND SUITES

Guests have their own individual needs and expectations of what their hotel stay should look like. Whether guests are business travellers, city hoppers, or guests who want to relax with pleasure, the hotel should offer them maximum comfort in creating the right ambience according to activity. Especially in luxury rooms, the aesthetics of the lighting solutions should be in line with the interior design and furnishings.



FIGURE 5.8 THE SCARLET HOTEL IN LONDON, UK

- **Bedroom**

The illuminance required depends on the reflectance of the surfaces of walls, ceiling, floor and furniture. Dark interiors need more lighting. Lighting installed under the bed can be very well used as orientation light or non-disturbing nightlight. The choice for different luminaire but with the same look and feel (matching design) is recommended. Bedside control should also be available. Functional cleaning lighting will enable the staff to do their job effectively.

- **Bathroom**

Bathrooms are required to serve different purposes at different times of the day. In the morning guests want a bright atmosphere to start the day. In the evening they prefer a warmer ambience. Lighting can easily be adapted to meet these requirements using different luminaire systems and light colors. User control panels will offer the possibility to switch pre-programmed lighting scenes.

- **Sitting room**

In the sitting room, a cozy homelike atmosphere should exist. Guests should be able to control lighting scenes according to the need of the moment, like communicating, having a drink, watching television, working or just relaxing.

- **Balcony**

The balcony is mainly used for relaxation. During the evening hours, balcony lighting should create a soft, warm and cozy ambience. In these areas where there is typically a relative low brightness, glare should be avoided.

Functionalities

Improve guest satisfaction and comfort

- Long lifetime LED lights – reduction of number of broken bulbs in the guest room.

- A guest room must provide an ambience for each guest activity. Coloured light scenes selection provided by ease of use interfaces: wake-up, work or relax.

Reduce energy and lighting consumption

- LED lighting – with low energy and maintenance costs. The current situation in a lot of hotels is that daily checking rounds to identify broken bulbs are necessary in order to avoid negative guest experiences. In these areas, current lighting installations are mostly a mix of halogen and CFL.
- Ability to report to the Building Management System (BMS) allows activation and control of particular guest rooms from the front desk or other management computer.
- Implementation of a guest room control system can manage lighting, blinds, heating and air conditioning.
- Integration of a card holder system actuator ensures that only occupied rooms consume energy from lighting, heating, air conditioning, radio and television.

Required levels of light

In luxury rooms and suites, as shown in Table 5.4, there are no required levels of light according to the EN 12464-1 norm.

Norm EN 12464-1 requirements	E_m (lux)	UGR_L	U_0	R_a	Specific requirement
luxury rooms and suites	-	-	-	-	No requirements

TABLE 5.4 REQUIRED LEVELS OF LIGHT IN LUXURY ROOMS AND SUITES

Lighting design

In Figure 5.9, a sample floor plan of a full lighting design of a luxury room or suite is shown. At the bottom of the figure, the luminaires, lamps and controls used for the design are listed.

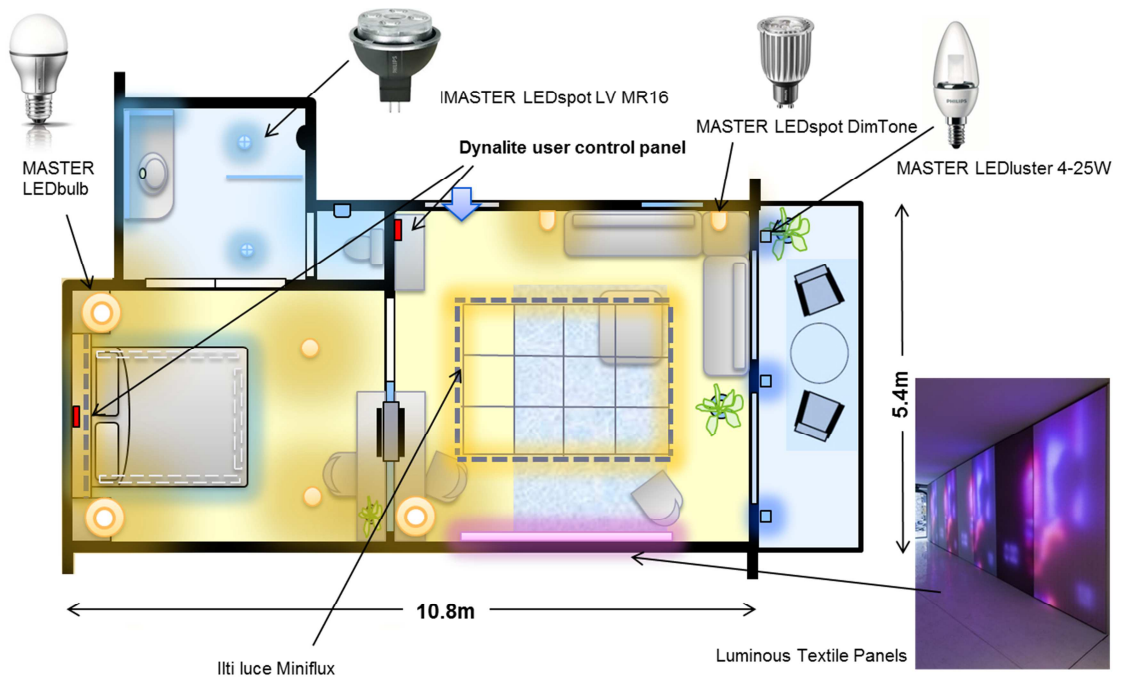


FIGURE 5.9 EXAMPLE OF LIGHT PLAN OF LUXURY ROOM OR SUITE

5.5 BARS, RESTAURANTS AND LOUNGES

Bars, restaurants and lounges are those places where people meet, unwind, socialize and simply enjoy the moment. For these areas, in which guests also eat or drink, high quality mood lighting should be installed. Lighting needs to ensure that guests can find their way around and conduct conversations at the table while facing in any direction.



FIGURE 5.10 PARK HYATT, SYDNEY, AUSTRALIA

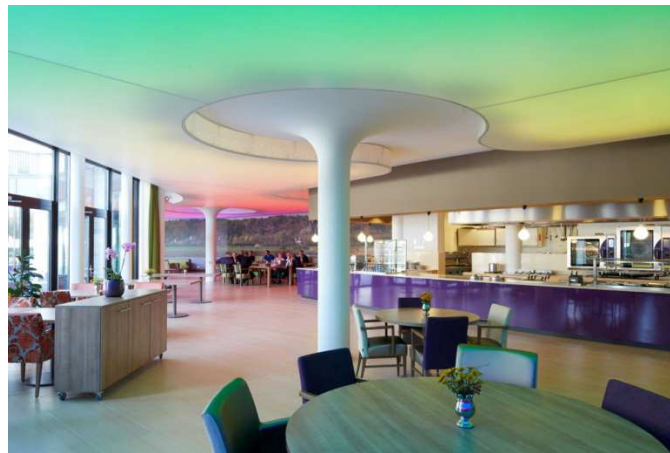


FIGURE 5.11 ZYG HERSTELHOTEL PARK DEKKERSWALD GROESBEEK, THE NETHERLANDS

- **Bar**
While guests enjoy their stay, staff needs to be able to perform specific visual tasks. Illuminance levels and color rendering are important factors. Integrated lighting in shelves and display cabinets shows decorativeness and cleanliness. The use of small light sources in the ceiling makes surfaces look sparkling. Dynamic colored light is extremely suitable to create a distinct atmosphere.
- **Restaurant**
The kind of artificial lighting used in restaurants primarily depends on the style of the establishment. The range of conceivable lighting moods here is endless, from sparkling brightness (e.g., for lunch or business environment) to intimate candlelight (e.g., for dinner). It is important that the lighting installed ensures that food is clearly presented and looks attractive and fresh. The visual conditions at the table area should be right for conversation.

Functionalities

- LED lighting – with low energy and maintenance costs. In these areas, current lighting installations are mostly halogen for its dimming possibilities and the quality of the light they provide.
- In bars one should be capable of creating distinct changes in atmosphere and mood to suit different occasions such as nightclub style, concerts or DJs.
- In restaurants one has to provide three very different lighting scenes since breakfast, lunch or dinner will ask for different moods.
- Pre-set lighting scenes can be selected via an intuitive user interface or run under a schedule.

Required levels of light

In Table 5.5, the required levels of light in bars, restaurants and lounges according to the EN 12464-1 are given.

Norm EN 12464-1 requirements	E_m (lux)	UGR_L	U_0	R_a	Specific requirement
Restaurants, dining rooms, function rooms	-	-	-	>80	The lighting should be designed to create the appropriate atmosphere
Self-service restaurant	>200	<22	>0.40	>80	
Buffet	>300	<22	>0.60	>80	

TABLE 5.5 REQUIRED LEVELS OF LIGHT IN BARS, RESTAURANTS AND LOUNGES

Lighting design

In Figure 5.12, a sample floor plan of a full lighting design of a bar and restaurant is shown. At the bottom of the figure, the luminaires, lamps and controls used for the design are listed.

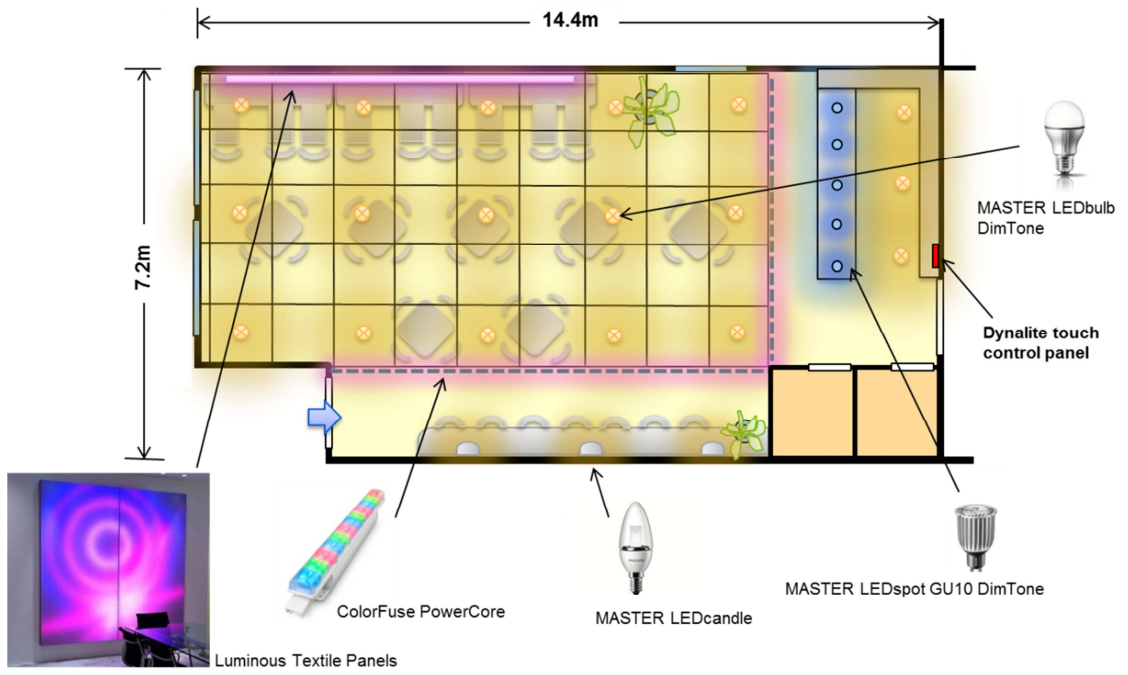


FIGURE 5.12 EXAMPLE OF LIGHT PLAN OF BAR AND RESTAURANT

5.6 WELLNESS AREAS

Wellness areas in hotels premises are places that offer relaxation and harmony. Here a total contrast with the world of business and its associated stresses should be created. Lighting can have a positive effect on sports and activity. Especially dynamic light, derived from natural changes throughout the day, has a positive effect on our biological clock and so help the body to restore in a natural way.



FIGURE 5.13 GRAN MELIÁ PALACIO DE ISORA HOTEL, TENERIFE, CANARY ISLANDS, SPAIN



FIGURE 5.14 THE ROYAL PALM PLAZA, BRAZIL

- **Spa**
The visual impact of cleanliness and hygiene will increase by raising the level of brightness and using lamps of a cooler colour temperature light. The effect of underwater lighting combined with dimmable spots in the ceiling will have everything to help guests to recharge their batteries. Changes in brightness, colour, saturation and colour temperature of the light can be realized by user interfaces. Special lighting solutions with higher degree of protection need to be used in rooms with higher levels of humidity, like pool areas and sauna.
- **Fitness**
Also in a sports facility like fitness areas, it is important to create an impression of hygiene. Distinct lighting enhances the experience of outdoor freshness,

without causing accessibility problems for staff when it comes to cleaning and maintenance.

Functionalities

- LED lighting – with low energy and maintenance costs.
- Lighting solutions for wellness areas should provide high flexibility to deliver a better guest experience. Both functional and decorative lighting solutions are equipped with a control system which can be used to create different lighting scenarios.
- Automatic reduction of energy consumption by dimming lighting levels when needed, while maintaining a pleasant environment.

Required levels of light

In Table 5.6, the required levels of light in wellness areas according to the EN 12464-1 are given.

Norm EN 12464-1 requirements	E_m (lux)	UGR_L	U_0	R_a	Specific requirement
Wellness	>100	<25	>0.40	>80	During night-time lower levels are acceptable

TABLE 5.6 REQUIRED LEVELS OF LIGHT IN WELLNESS AREAS

Lighting design

In Figure 5.15, a sample floor plan of a full lighting design of a wellness area is shown. At the bottom of the figure, the luminaires, lamps and controls used for the design are listed.

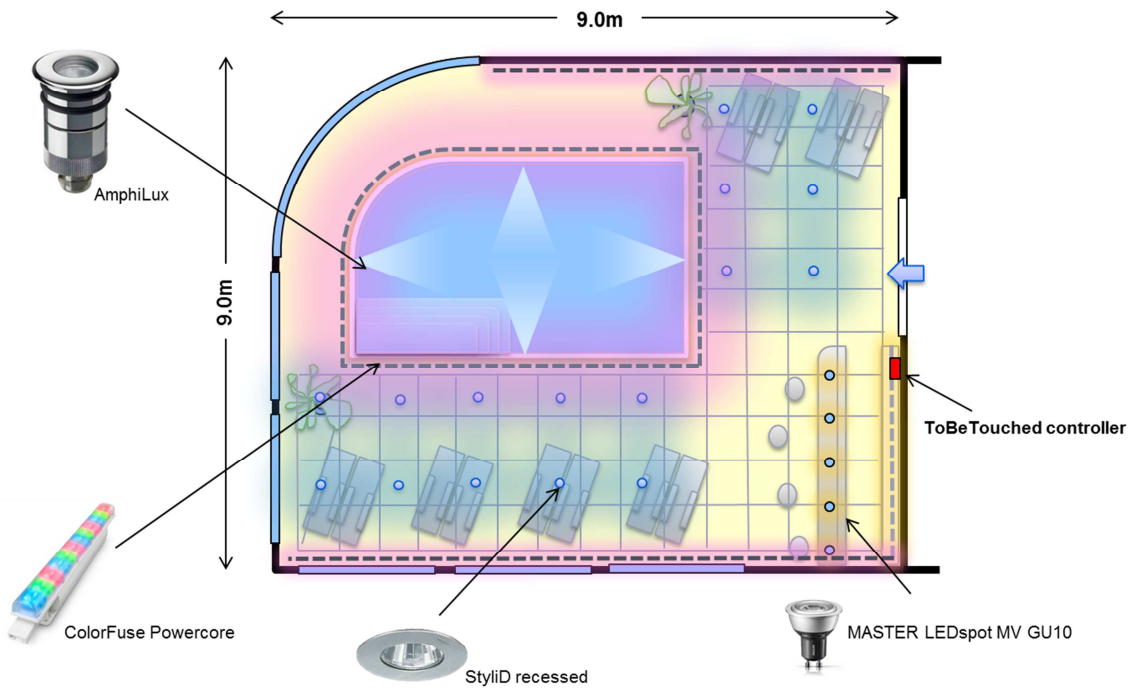


FIGURE 5.15 EXAMPLE OF LIGHT PLAN OF WELLNESS AREA

5.7 CONFERENCE AND MEETING AREAS

During the day, highly energy efficient light sources and luminaires will offer the best illumination at the lowest cost. At night, only the change of lighting can transform the conference or meeting room into a spectacular gala or dancing hall.



FIGURE 5.16 NORDIC LIGHT HOTEL, STOCKHOLM



FIGURE 5.17 REGARDZ MEETING CENTER, ZWOLLE, THE NETHERLANDS

- **Conference rooms**
Conference rooms are used to perform all kind of activities like, team meetings, receiving visitors, or presenting information to clients. Therefore, conference rooms need to support a lively discussion and in-depth consultation as well as cater to the needs of multimedia technology. The lighting systems for conferences, lecture or seminars are designed to support all these different communication needs.
- **Meeting rooms**
The lighting in meeting rooms needs to be designed for maximum flexibility and visual comfort. Different light scenes can provide the right atmosphere for a focused discussion, a creative session or a presentation. *Light Meetings* are a new form of conference held at the 15 meeting venues in the Nordic Light Hotel in

downtown Stockholm, shown in Figure 5.16. When the door is opened, movement sensors automatically change the color to white light at 4000K. All the rooms have an intuitive touch display control on the wall. The display facilitates the choice of a range of atmospheric settings, with both light and audio effects such as blue wavy light and the sound of lapping water, or high-intensity white light with birdsong.

Functionalities

- LED lighting – with low energy and maintenance costs. In these areas, current lighting installations are mostly a fluorescent (TL and CFL).
- Flexible lighting system that can be adapted to offer a palette of meeting experiences, such as energizing, presentation, brain storming and socializing ambiances.
- Control single lights, pre-defined light scenes, audio-visual devices and other devices, such as motorized blinds and curtains via a button panel, display or a hand-held infrared remote to adjust the settings from anywhere in the room.

Required levels of light

In Table 5.7, the required levels of light in conference and meeting areas according to the EN 12464-1 are given.

Norm EN 12464-1 requirements	E_m (lux)	UGR _L	U_0	R_a	Specific requirement
Conference and Meeting rooms	>500	<19	>0.60	>80	Lighting should be controllable

TABLE 5.7 REQUIRED LEVELS OF LIGHT IN CONFERENCE AND MEETING AREAS

Lighting design

In Figure 5.18, a sample floor plan of a full lighting design of a meeting area is shown. At the bottom of the figure, the luminaires, lamps and controls used for the design are listed.

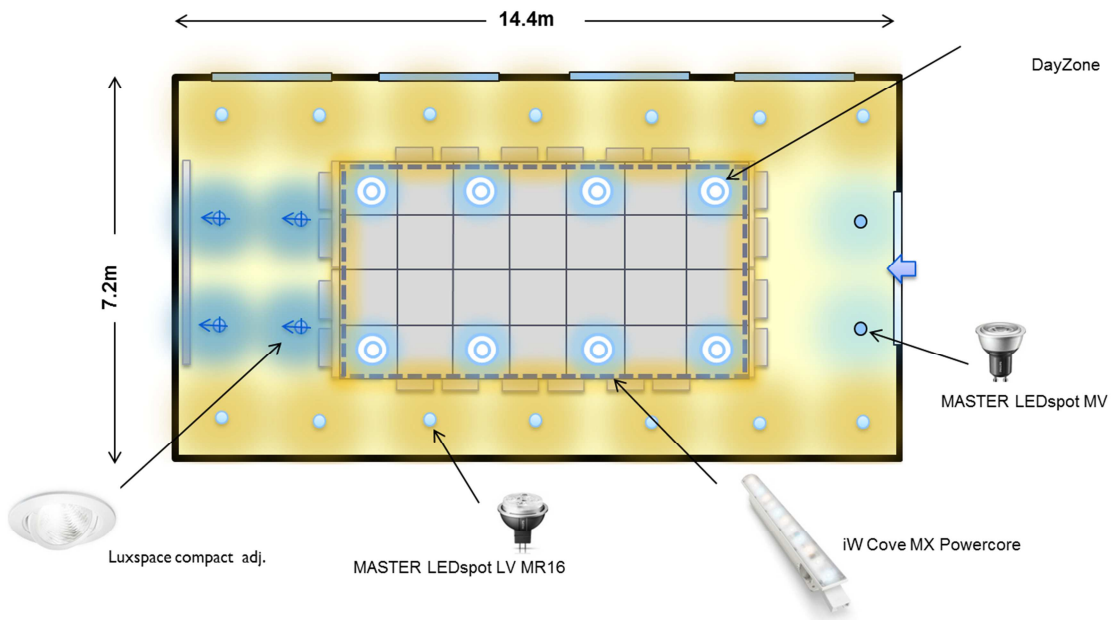


FIGURE 5.18 EXAMPLE OF LIGHT PLAN OF MEETING AREA

5.8 FAÇADE AND CAR PARK

An illuminated hotel façade can become a landmark that attracts and captivates guests. The illuminated exterior of a decorative building at night boosts the hotel prestige and swiftly and easily guides guests to the entrance door. Architectural lighting can make a hotel look unique which leaves behind an agreeable and unforgettable memory.



FIGURE 5.19 BELLA SKY COMWELL HOTEL. COPENHAGEN, DENMARK

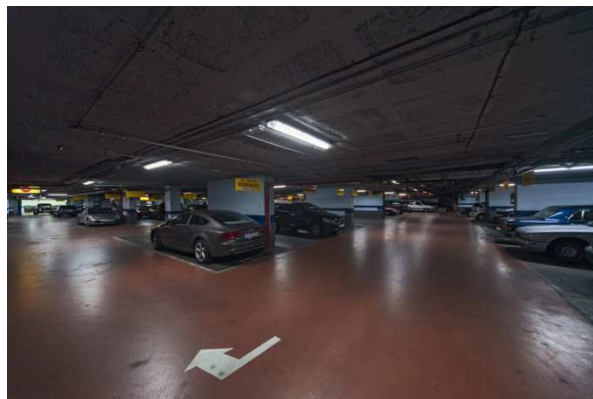


FIGURE 5.20 NH HOTELES EUROBUILDING CAR PARK, MADRID, SPAIN

- **Façades**

Floodlighting a building from outside can make the building stand out from the neighboring buildings. Already illuminating the window facades from inside can lend it an open, filigree appearance. But illuminating from outside a façade should follow the lines and contours of the architecture. Artificial lighting at night can give a totally different image at night than during daytime. New technologies even allow painting the façade in a dynamic way with light.

- **Car parks**

Most parking facilities operate 24 hours a day. Energy efficient lighting solutions (LED lighting and controls) are essential to help reduce carbon emissions and energy costs. The principle of lighting control is to only light areas that are occupied or truly need light. This can only be achieved using technical measures, such as timers, occupancy sensors and automatic lighting control.

Functionalities

- LED lighting – with low energy and maintenance costs. In these areas, current lighting installations are traditionally using wall washers that give a lot of high pollution as well as wasted energy.
- Generate grand-scale, color-changing effects to wash up façades and other outdoor areas.
- Provide illumination only when it is needed (for increased energy efficiency). Installing lighting controls that use photo sensors to monitor daylight conditions combined with motion detectors is a great way to ensure that lights work full power only when necessary.

Required levels of light

In Table 5.8, the required levels of light in façades and car parks according to the EN 12464-1 are given.

Norm EN 12464-1 requirements	E_m (lux)	UGR_L	U_0	R_a	Specific requirement
Indoor car park	>75	-	>0.40	>40	1. Illuminance measured at floor level. 2. Safety colors shall be recognizable. 3. A high vertical illuminance increases recognition of people's faces and therefore the feeling of safety.
Outdoor car park	>10	<50	>0.25	>20	

TABLE 5.8 REQUIRED LEVELS OF LIGHT IN FAÇADE AND CAR PARKS

Lighting design

In Figure 5.21, a sample floor plan of a full lighting design of the entrance of a hotel is shown. At the bottom of the figure, the luminaires, lamps and controls used for the design are listed.

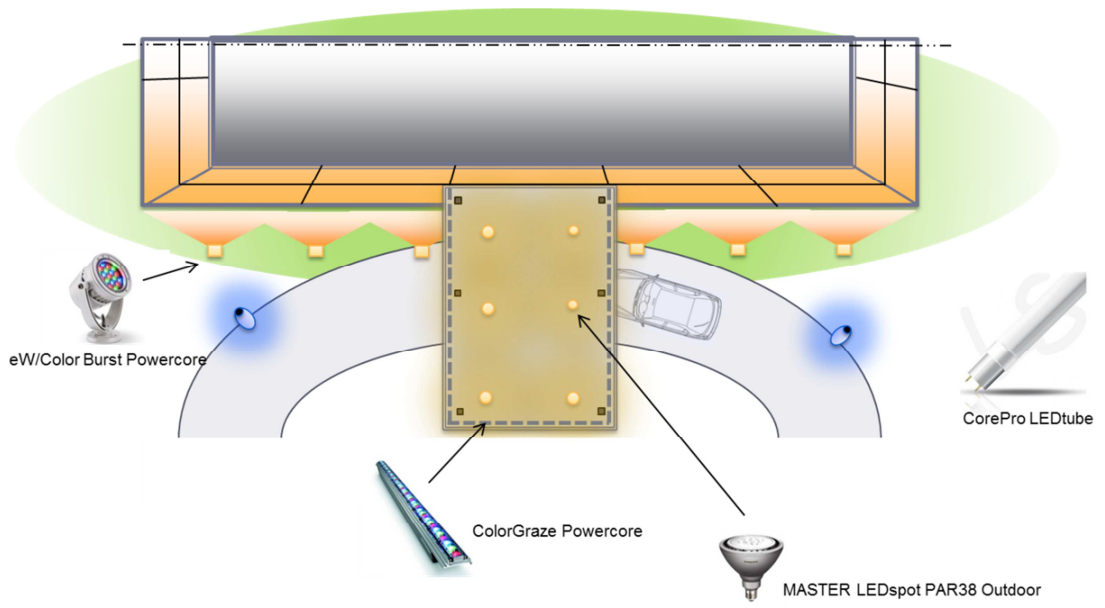


FIGURE 5.21 EXAMPLE OF LIGHT PLAN OF HOTEL ENTRANCE

5.9 CONTROL FUNCTIONALITIES BY AREA

On Table 5.9 an overview of the control functionalities per area is given. Per each application (or area), different functionalities are needed such as:

- Energy Saving Movement Detection Dimming (MDD)
- Integrated Daylight Dimming Systems (IDDS)
- Pre-set lighting scenes
- Schedule based (timer clock)
- User Interface (control by Guest or Staff)
- Master Switch
- Local temperature and blinds control (Guest via User Panel)
- Central temperature and blinds control (via BMS)
- Audio/Video Integration

	Energy Saving Movement Detection Dimming (MDD)	Integrated Daylight Dimming Systems (IDDS)	Pre-set lighting scenes	Schedule based (timer clock)	User Interface (control by Guest or Staff)	Master Switch	Local temp. and blinds control (Guest via User Panel)	Central temp. and blinds control (via BMS)	Audio/Video Integration
Reception and Lobby					S				
Corridors and other areas of transition									
Guest Rooms					G				
Luxury Rooms and Suites					G				
Bar and Restaurant					S				
Wellness areas					S				
Conference and meeting areas					S & G				
Car parks and outdoor areas									
Car parks									
Outdoor areas (façade)					S				

TABLE 5.9 SOLUTION FUNCTIONALITIES BY AREAS

6 GUESTROOM SOLUTIONS

This chapter gives a detailed description of the lighting solutions developed for the guestrooms. As very diverse needs are identified among hotel owners and managers, different solutions (for different levels of luxury) have been created.

From the moment a guest enters their guest room, hotels seek to provide an unmatched level of service and convenience. It is a fact that guest room experience is a major factor in return bookings. Although energy efficiency is important, guest experience is key and lighting and user interfaces (switches, thermostats, sensors) play an important role. Therefore, it is very important for all hotels to prevent annoying factors.

Hospitality customers (for example, hotel managers) are looking for systems that are more than just turning the light on and off. They want a solution that is energy-efficient, flexible, easy to use which will help enhance the guest experience. The majority of hotel guests use their rooms mainly in the evening and at night, so lighting plays a particularly important role here. Lighting design for guest rooms should be geared primarily to the need for ambience and comfort, which in lighting terms means luminaires which are individually switchable and which can be regulated to the ambience that fits best to the different room activities. Guests should be able to select the level and distribution of brightness in the room to suit their activity and mood. For this reason alone, individual dimming and scene setting is recommended for regulating lighting levels. Convenience is significantly heightened by installing control panels at the entrance of the room and at the bed side.

In Europe, there are no established, specific levels required for guest rooms for the factors of lux, illuminance, color rendering, unified glare rating or uniformity (norm EN12464-1, see Chapter 5, Guestrooms). However, there are general design guidelines that need to be considered. The number of light sources indicated below is only an indication that most of the times refer to the minimum number of lights needed.

- **Guest room general lighting**
 - In the guest room, sufficient light should be available in working, reading and personal preparation areas with 300 lux minimum in each area.
 - There will a light source at each side of the bed and a minimum number of two ceiling lights, with sufficient lighting. If the rooms have two beds, each light will be located right above the center of each bed.
 - A light point will be fitted in the ceiling (a free standing lamp is also possible) above the armchair/lounge area.
 - A table lamp (articulated is recommended) on the dressing table or writing desk.
 - A minimum number of two ceiling lights in the entrance hallway.
 - The cupboards will have an interior light that will activate automatically when the door is opened. In its absence there will be a light in the cupboards area which will allow guests to see the interior without any shadows.
 - The light intensity will be controlled with a dimmer in suites.

- Switches must be accessible from the bed, simple to use and easily identifiable.
 - Energy saver card-switch should have luminous indicator that can be visible at night.
- **Bathroom lighting**
 - There will be sufficient lighting in the bathroom.
 - Sufficient lighting of 500 lux must be provided in areas used for cleansing purposes.
 - Lights by the washbasin should preferably be in a lateral position in order not to throw any shadows.
 - Light above bath/ shower should be watertight.
 - Switches must be accessible from the entrance of the bathroom, simple to use and easily identifiable.
 - Bathrooms must have safety sockets.
- **Electrical sockets**
 - Sockets should be located so as to allow the most appropriate positioning of equipment and lighting using the shortest possible cable length.
 - Wiring cables of connected devices will be discretely and neatly arranged.
 - Some easily accessible sockets should be available permanently for use by guests. The corresponding voltage should be indicated next to each plug.
 - Protection in all rooms against direct and indirect contact in the mains will be in phases, so that a failure in one phase won't affect more than one third of the mains. This prevents the room from being completely dark.

During this assignment, in order to meet the requirements of the different Hospitality customer's profiles, three levels of solutions (from basic to customized) have been developed for the guest rooms as shown in Table 6.1. A practical but arbitrary choice is to split into three value propositions as a 'low-mid-high' offering. It has been chosen to name these propositions as: *Energy* (immediate solution), *Comfort* (small renovations solution) and *ComfortPlus* (customized solution).

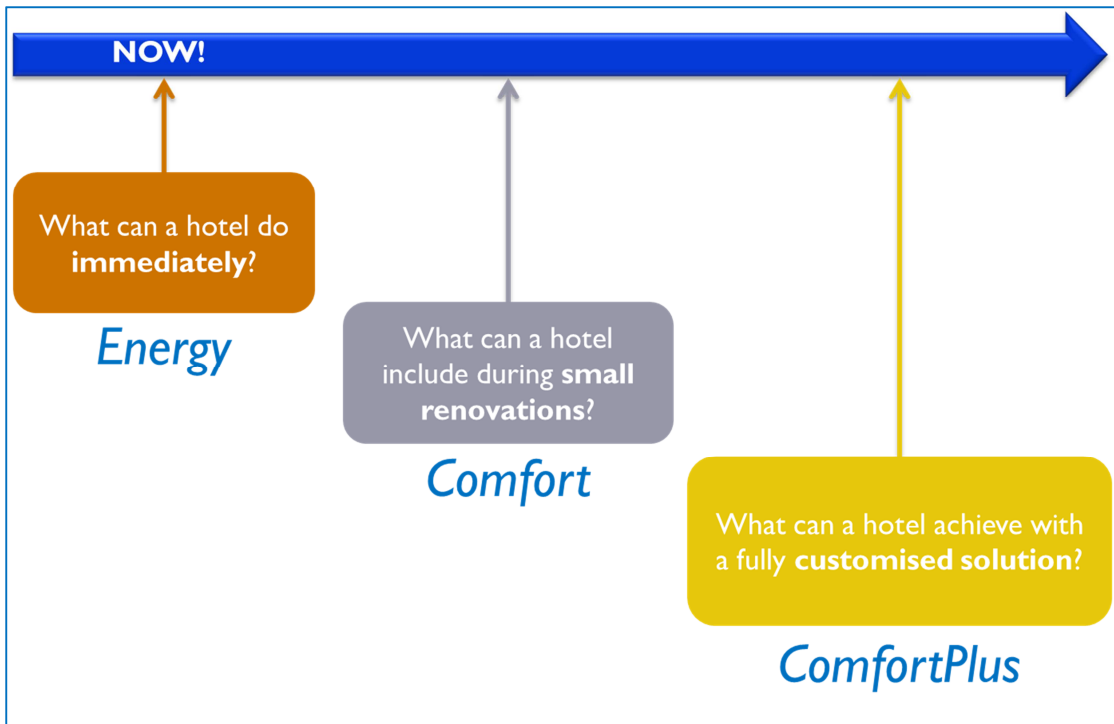


TABLE 6.1 EXAMPLE OF GUESTROOMS SOLUTIONS

6.1 ENERGY

The first level of solution developed is the *Energy* proposition. As shown in Figure 6.1, the *Energy* proposition consists of a LED lamp replacement.

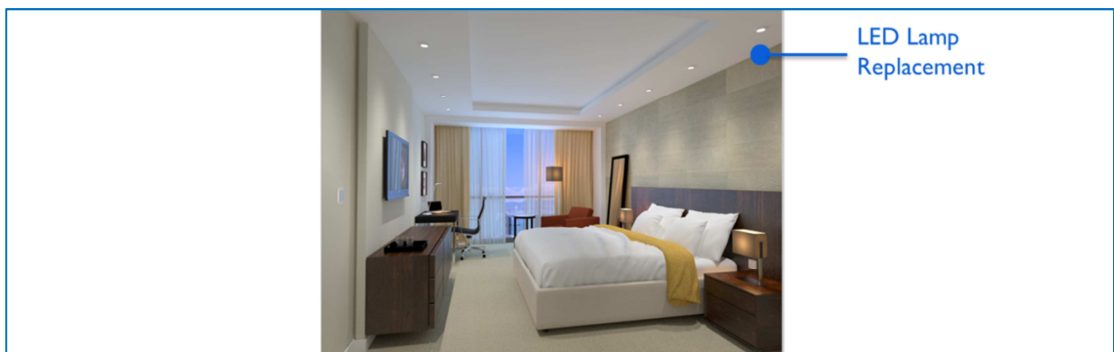


FIGURE 6.1 EXAMPLE OF ENERGY PROPOSITION FOR GUESTROOMS

- Insight**
 Hotels are searching for solutions that would consume less power without compromising the level of lighting defined at the outset. Other decisive factors are the quality of light, the product design and long life expectancy.
- Proposition**
 Provide an extensive portfolio of new LED technology that will meet the needs of all types of spaces (i.e., light levels and dimming) while minimizing costs and maintenance.

- **Benefit**

LED technology results in energy savings and reduction of maintenance. Dimmable light sources are highly efficient and deliver a saving in power consumption that depends on the installed current technology in the room (25 to 80%). Additional benefits are lower maintenance needs and green image. Hotels within certification/standardization programs feature a number of elements that focus on energy and water efficiency and recycling (see Chapter 4). With more and more travelers booking their travel online, becoming certified opens up numerous online marketing channels that can help attract a growing population of eco-conscious customers.

- **Value**

- Operational cost savings
- Maintenance cost savings
- Environmental and energy certification

- **Features**

LED Technology

- Low energy use
- Low heat output
- Long life time
- Color consistency
- Transformer compatibility¹
- High performance dimming²

- **Differentiators of Philips solutions**

Long guarantee provided, which proves the high reliability, quality and performance of the lighting Philips solutions. Especially in places like guest rooms where the atmosphere created by the lighting is very important, one of the advantages of Philips LED light sources is that in addition to their warm color, they can also be dimmed without losing light quality, ideal characteristic for creating attractive and comfortable surroundings. In general, LED lighting has longer lifetime than conventional technologies. But also, Philips LED lamps have a higher quality over time, which means lower number of lamps that are dead on arrival and lower number of failures over the lifetime.

¹ Philips has designed a unique (patent protected) intelligent driver concept for low voltage (12V) LED lamps, which enables broad compatibility with existing electronic and electromagnetic Halogen transformers. Therefore, Philips low voltage (12V) LED lamps universally replace 12V Halogen spot lamps with unique first class transformer compatible electronics.

² High dimming performance: smooth dimming curve, deeper dimming level and one to multiple lamps

6.2 COMFORT

The second level of solution developed is the *Comfort* proposition. As shown in Figure 6.2, the *Comfort* proposition consists of a LED lamp replacement, consumer luminaires (bedside right lamp, bedside left lamp, floor lamp and table lamp), a master switch, a user interface, a card holder that acts as a system actuator and a controller to control the temperature and the blinds.

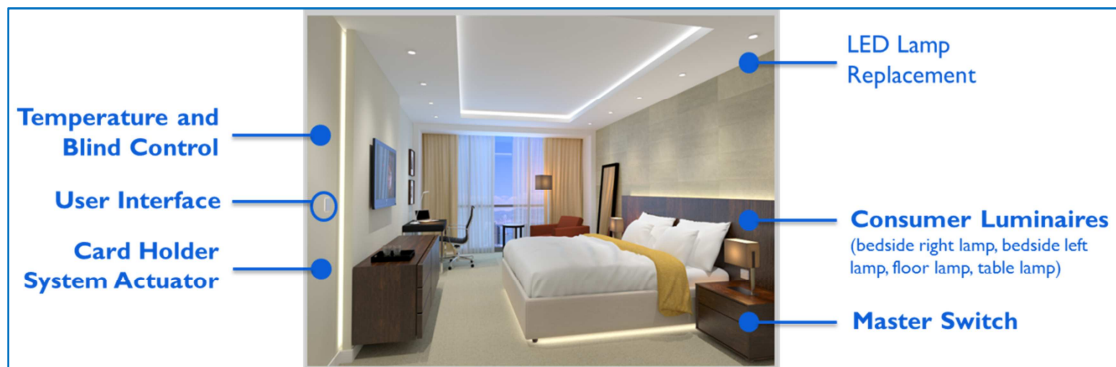


FIGURE 6.2 EXAMPLE OF COMFORT PROPOSITION FOR GUESTROOMS

- **Insight**
Hotels are looking for lighting solutions that are very energy-efficient without compromising hotel's requirements in the field of comfort, image and ambience.
- **Proposition**
Total guest room control system, the right investment decision regarding cost, guest experience and sustainability.
- **Benefit**
Through the control system, the level of lighting of the entire lighting solution can be fine-tuned to meet user requirements. This level of solution also allows controlling individual local temperature levels and blinds in the room. By integrating with the key card system actuator, all the electrical uses in the room will be automatically switched off during unoccupied periods (except the refrigerator and the desk outlet). The main benefits are: quality of light, reduction in lighting and energy consumption, lower maintenance needs, green image and comfortable guest experience.
- **Value**
 - Operational costs savings
 - Maintenance cost savings
 - Environmental and energy certification
 - Increase guest return

- **Features**

- LED Technology

- Low energy use
 - Low heat output
 - Long life time
 - Color consistency
 - Transformer compatibility
 - High performance dimming

- Lighting Control and Energy Management

- Card Holder System Actuator
 - Ease of use interfaces
 - Scene selection
 - Heating, Ventilation and Air Conditioning (HVAC) integration

- **Differentiators of Philips solutions**

- Additionally to the *Energy* proposition differentiators, the *Comfort* proposition provides easy and intuitive mood lighting guest room technology. Integrated control system to provide pre-set lighting scenes via wall-mounted user panels. Easy installation, customizable solution and no on-site commissioning needed.

- **List of components**

- LED lamps.
 - Consumer luminaires: bedside right lamp, bedside left lamp, floor lamp and table lamp.
 - Card holder system actuator.
 - Antumbra panel: Six buttons are available and will reveal themselves when a person approaches. Buttons can be labeled with text or icons to help users with the functionality. Available in a range of different fascia and rim finishes, the Antumbra panel is one of the newest user interfaces, which can interact with the Philips room controller. The master switch functionality can be integrated in the Antumbra user panel.
 - Room controller

- **System description**

- Hotel room controller will automatically switch off all lighting channels, general power outlets, air conditioning and insulate the room when the guest leaves.
 - One touch functionality over all functions of the control system allows the guest to change their own environment quickly and simply.
 - One compact unit that has instant out of the box functionality. Controller can be preprogrammed to have different responses if required. Full range of low end to high end user interfaces available.

- **System diagram/architecture**

Figure 6.3 shows the system diagram of the *Comfort* level solution. The lamps and luminaires in the guestroom (left) and the Antumbra user panel (right) are connected to the GRMS controller (in the middle) that can control the lighting, the air conditioning, and the blinds.

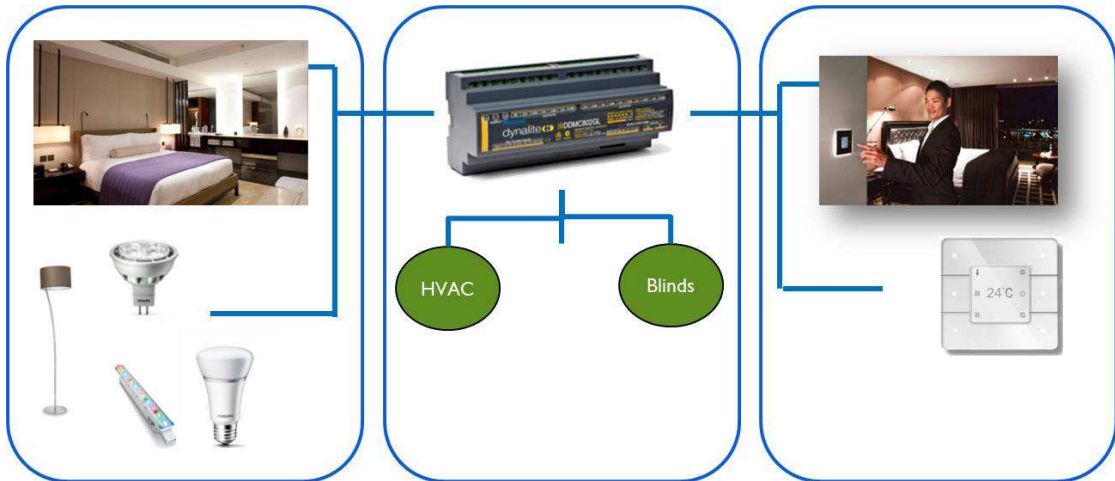


FIGURE 6.3 EXAMPLE OF COMFORT PROPOSITION SYSTEM DIAGRAM

6.3 COMFORTPLUS

The third at maximum level of solution developed is the *ComfortPlus* proposition. As shown in Figure 6.4, the *ComfortPlus* proposition consists of a LED lamp replacement, consumer luminaires (bedside right lamp, bedside left lamp, floor lamp and table lamp), cove color lighting, lighting channels (switching and dimming), a master switch, a user interface, presence detection, a card holder that acts as a system actuator and a Guest Room Management System (GRMS) controller that can control the temperature and the blinds and integrate with the Building Management System (BMS).

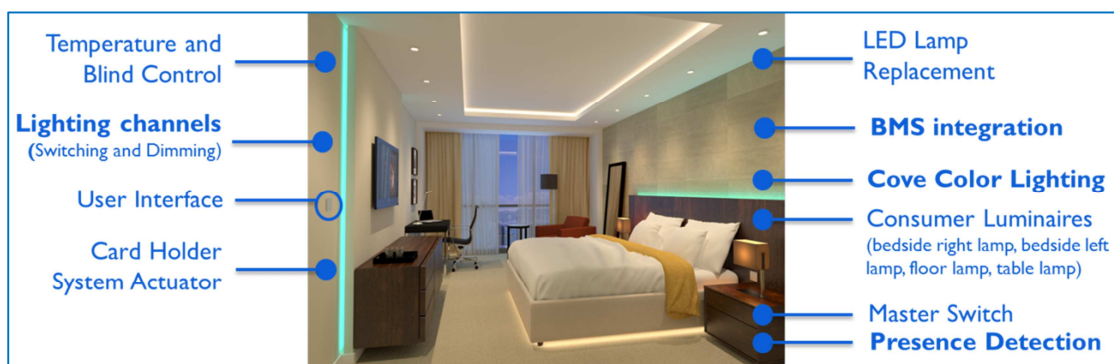


FIGURE 6.4 EXAMPLE OF COMFORTPLUS PROPOSITION FOR GUESTROOMS

- **Insight**

Hotels want to differentiate themselves by delivering good value while meeting their guest's high expectations. In the past, getting a hotel upgrade meant a

bigger room with a balcony or a view of the pool. Nowadays, the new trends in Hospitality include offering the best tailored atmosphere and environment for individual occasions to ensure a memorable stay and maximize guest loyalty.

- **Proposition**

Deliver innovation for top end hotels which are always looking for new ways to pamper their guests and enhance their comfort and experiences while creating new income streams without compromising energy usage.

- **Benefit**

The united guest room control system that can manage ambient lighting, temperature and blinds helps to deliver enhanced performance and superior customer experience as well as maximizing energy savings. By integrating with the key card system actuator and the BMS of the hotel building, all the electrical uses in the room will be automatically switch off during unoccupied periods and the guest rooms will be isolated or heated to a set-back temperature (as guests enter or leave the rooms, or when they check-in at the reception). The main benefits are: quality of light, reduction in lighting and energy consumption, lower maintenance needs, memorable guest experience, green image, unique personalized spaces and brand differentiation.

- **Value**

- Operational costs savings
- Maintenance cost savings
- Environmental and energy certification
- Increase guest return

- **Features**

LED Technology

- Low energy use
- Low heat output
- Long life time
- Color consistency
- Transformer compatibility
- High performance dimming

Lighting Control and Energy Management

- Card holder system actuator
- Ease of use interfaces
- Lighting channels (switching and dimming)
- Color scene selection
- HVAC integration
- BMS integration

- **Differentiators of Philips solutions**

Additionally to the *Comfort* proposition differentiators, the *ComfortPlus* is also a networked solution that can be integrated to the BMS of the hotel building.

- **List of components**

- LED lamps.
- Consumer luminaires: bedside right lamp, bedside left lamp, floor lamp and table lamp.
- Card holder system actuator.
- Antumbra panel: Six buttons are available and will reveal themselves when a person approaches. Buttons can be labeled with text or icons to help users with the functionality. Available in a range of different fascia and rim finishes, the Antumbra panel is one of the newest user interfaces, which can interact with the Philips room controller. The master switch functionality can be integrated in the Antumbra user panel.
- Room controller: GRMSPLUS, which on top of the GRMS10 features, has dimming, color and network control possibilities.

- **System description**

The room controller can communicate with the lamps and luminaires in the room but also with the HVAC and the blinds control if needed. In this level, the controller can be integrated with the Building Management System:

- BMS can trigger a particular change of scene, give climate control commands, and so on.
- BMS will receive room status such as temperature and light settings.

- **System diagram/architecture**

Figure 6.5 shows the system diagram of the *ComfortPlus* level solution. The lamps and luminaires in the guestroom (left) and the Antumbra user panel (right) are connected to the GRMS controller (in the middle) that can control the lighting, the air conditioning and the blinds as well as provide networked control by integration with the BMS.

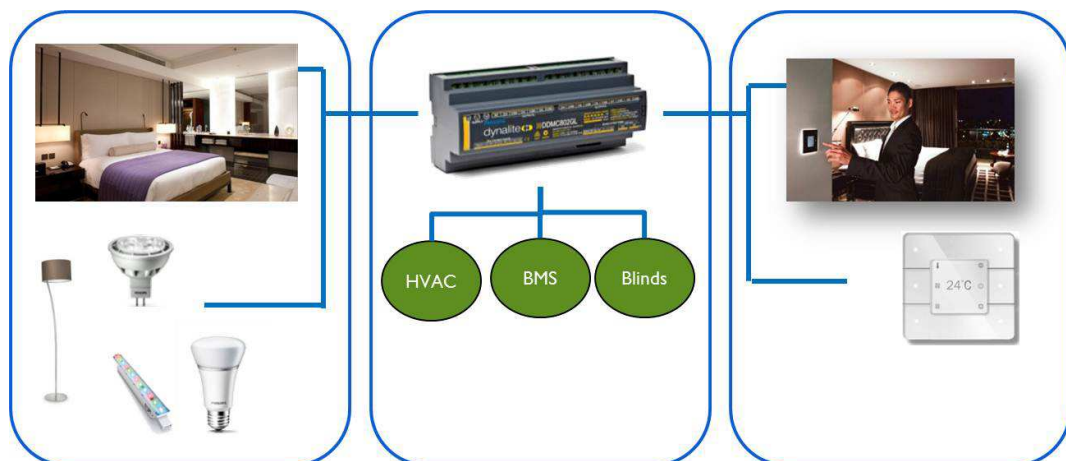


FIGURE 6.5 EXAMPLE OF COMFORTPLUS PROPOSITION SYSTEM DIAGRAM

7 MARKET IDENTIFICATION AND ANALYSIS

This chapter of the report is an analysis of the hospitality business market and its potential when offering total lighting solutions. Market size is an incredibly important metric for measuring the opportunities. Therefore, the analysis starts from sizing the Total Addressable Market (TAM). Then, taking into account the part of the total addressable market Philips can reasonably expect to reach considering its business model, the Serviceable Available Market (SAM) is calculated. Last, the Serviceable Obtainable Market (SOM) is calculated considering the practical limitations of the implementation of the business model as schematized in Figure 7.1.

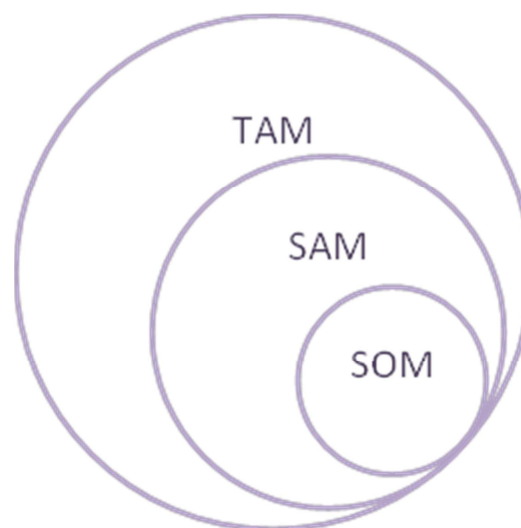


FIGURE 7.1 TOTAL ADDRESSABLE MARKET, SERVICEABLE AVAILABLE MARKET AND SERVICEABLE OBTAINABLE MARKET

As part of this chapter, an overview of the Philips Lighting solutions competition in the Hospitality market, and information regarding the different stakeholders' profiles are also presented.

7.1 DEFINING THE MARKET

The target end user for Hospitality total lighting solutions is the European hotel chains market, which at the end of 2011 comprised about 19,900 hotels with 1.99 million rooms (Otus Hotel Brand Database, Overview report: Europe 2012). These hotels are spread through 48 of 54 countries in about 4,900 cities, towns and villages. It is also estimated that the total hotel market in Europe is 5.4 million rooms, meaning that the chains form 37% of the market.

International brands are a popular choice with business travelers, as they generally offer standardized experiences. Accor is by far the largest group, with more than 270,000 rooms and four of the top ten brands: Ibis, Ibis Budget Hotels (formerly Etap), Mercure and Novotel. The other six are: Holiday Inn (InterContinental Hotels Group), NH Hotels

(NH Hoteles SA), Radisson Blu (Carlson Rezidor Hotel Group), Hilton (Blackstone Group) and Travelodge.

Brand	Group	Number of hotels	Number of rooms	Average size	Percentage of total rooms (%)
Ibis	Accor	715	76,303	107	3.8
Mercure	Accor	503	57,349	114	2.9
Holiday Inn	InterContinental	284	46,000	162	2.3
Premier Inn	Whitbread	606	44,929	74	2.3
Novotel	Accor	259	42,877	166	2.2
NH Hotels	NH Hoteles	276	41,550	151	2.1
Radisson Blu	Carlson Rezidor	175	40,305	230	2.0
Hilton	Blackstone Hilton Worldwide	155	40,285	260	2.0
Ibis Budget	Accor	431	36,827	85	1.9
Travelodge	Travelodge	493	33,528	68	1.7

TABLE 7.1 TOP TEN BRANDS, END-2011

- **Accor** is a French hotel group, which operates in 92 countries. Headquartered in Paris, France, the group owns, operates and franchises 3,500 hotels on five continents. Accor has hotels in a range of economic travel segments, from luxury to budget class hotels, and probably is the most established company in Europe. Accor top three brands within Europe are Novotel (259 hotels), Mercure (503 hotels), and Ibis Budget (431 hotels). The other brands from the group are Sofitel, Suitehotel, Ibis Styls, Ibis Rouge and Formule 1. Within its hotel portfolio, a majority of rooms are operated under ownership structures that offer operating leverage (owned, leased and managed) and the rest are franchised (source: Accor Press Kit, figures as of June 2012).
 - **Owned** (10%): Accor owns and operates the hotel.
 - **Leased** (34%): Accor operates the hotel and pays a rent to the owner of the hotel building.
 - **Managed** (31%): Accor manages the hotel for the owner, which covers the operating costs.
 - **Franchised** (25%): Accor contributes its expertise and the strengths of its network to the owner who manages the hotel under a Group brand.

- **InterContinental** Hotels Group PLC, InterContinental Hotels Group or IHG is a British multinational hotels company, headquartered in Denham, UK. The group has over 4,600 hotels across over 100 countries. Its top three brands within Europe are InterContinental, Crowne Plaza, Holiday Inn and Holiday Inn Express. But the group also includes Candlewood Suites, Even, Hotel Indigo, Hualuxe, and Staybridge Suites

brands. Around **85% of their hotels are franchised**, which means that the decisions are mostly made on property level.

- **NH Hoteles SA** or NH Hotels is a Spanish-based hotel chain headquartered in Madrid. NH offers moderately priced and modernly-furnished hotel rooms and lobbies, located primarily in Europe, Latin America, and Africa. NH Hoteles ranks third in the European ranking for business hotels. Since only a **small percentage of NH Hotels are franchised** (20%), the decisions within the chain group are made centrally by the headquarters in Madrid, Spain.
- **Carlson Rezidor Hotel Group**, previously known as Rezidor SAS, operates more than 200,000 rooms in 81 countries. It is the world's ninth largest hotel group and its headquarters are located in Minneapolis and Brussels. Its top two brands within Europe are Radisson Blue (158 hotels) and Park Inn (94 hotels). Although the group only manages half of the hotels (the other half are leased and franchised) the **central procurement department** set up strict brand specifications as well as regular quality assurance inspections to monitor quality and performance.
- **Blackstone Group L.P.** is an American-based multinational private equity firm. Although the Blackstone Group acquired **Hilton Hotels Corporation** in July 2007, decisions are left to the Hilton Worldwide company. As of August 2012 Hilton brands encompass 3,897 hotels with over 642,000 rooms in 91 countries. The company owns, manages and franchises a portfolio of brands which includes the following top 5 brands in Europe: Hilton (115 hotels), Double Tree (11 hotels), Hilton Garden Inn (10 hotels) and Hampton (nine hotels). In the US many of Hilton's properties are franchised to independent operators and companies. However, franchisees must follow strict brand standards in order to maintain a licensing agreement with Hilton Worldwide. In Europe, **the franchise model is less established, with less than 10% of the total number of properties**. According to data released by STR Global, one in six hotel rooms currently under construction in Europe carry the Hilton Worldwide brand. Growth in Europe has been so strong that for the first time in its history, Hilton will have more rooms under construction outside of the US than within. Eastern Europe accounts for a large percentage of new build activity. Hilton has 27 hotel openings planned for Russia, 15 for Turkey and 13 for Poland across the company's six regional brands. Although less dynamic, Western Europe is showing clear signs of recovery. A total of 18 new developments are planned for the UK, along with significant high-end openings in Berlin and the Algarve.
- **Travelodge** refers to several hotel chains around the world. However, many of these are operated by independent companies who have no connection with the brand in other countries. **Within Europe, Travelodge operates more than 500 hotels in United Kingdom (with central decision making)**, 12 in Ireland and four in Spain. It is the second largest in the budget hotel sector (behind Premier Inn) and third biggest hotel chain in the UK by number of bedrooms.

- **Whitbread PLC** is a multinational hotel, coffee shop and restaurant company headquartered in Dunstable, United Kingdom. Its largest division is Premier Inn, which is the largest hotel brand in the UK with around 650 hotels and over 52,000 rooms plus one hotel in Republic of Ireland and a number of hotels in Dubai and India.

Although the following groups **are not in the top 10 ranking for Europe** shown in Table 7.1, they also operate a large number of hotels in Europe.

- **Marriott** currently has over 279 properties in Europe, and 37 approved or under construction as of year-end 2012. The top three brands in Europe are Renaissance (31 hotels), Marriott (83 hotels) and Courtyard (43 hotels). Marriott enjoys a **strong collaborative relationship** with its owners and franchisees (23% of the total number of Marriott hotels).
- **Louvre Hotels Group** is a French company headquartered in Paris, France. The range of hotel brands was extended in 2009 with the purchase of ComfortPlusen Tulip Hospitality Group. Louvre Hôtels Group owns the European hotel brands Première Classe (1 star), Campanile (2-3 stars), Kyriad (2-3 stars), Kyriad Prestige (3 stars), Tulip Inn (3 stars), ComfortPlusen Tulip (4 stars), and Royal Tulip (5 stars). In total, **Louvre owns and manages around 280 hotels, 268 hotels are under management contract and 468 are franchised (46% of the total)**.
- **Scandic Hotels** is a hotel chain headquartered in Stockholm, Sweden with its main operations in the Nordic countries (146 hotels). Alongside hotels in Sweden, Norway, Finland and Denmark, the company also has a presence in Belgium and the Netherlands (three hotels), Germany and Poland (three hotels).
- **Starwood Hotels and Resorts Worldwide, Inc.** is an American hotel and leisure company headquartered in Stamford, Connecticut. The top 3 brands in Europe are Le Méridien, Sheraton and Luxury Collection from which **20% are franchised**.
- **CHI Hotels & Resorts** (Previously Corinthia Hotels International) is a hotel management company based in Malta that provides technical assistance and management services to hotel owners worldwide. CHI is the exclusive operator and developer for the luxury Corinthia Hotels brand in Europe (eight hotels), Africa and the Middle East.
- **Nordic Choice Hotels** (until December 31, 2010 known as Choice Hotels Scandinavia) is one of the largest hotel chains in the Nordics with approximately 170 hotels. The hotels is marketed under six chains; Clarion Hotels, Clarion Collection, Comfort Hotels, Quality Hotels, Quality Resort and Nordic Hotels & Resorts. Nordic Choice Hotels **is a franchisee of Choice International**. The franchise agreement gives the company the right to use three brands and their umbrella brands. Apart from that, **Nordic Choice Hotels is in most aspects run independently from Choice International**.

7.2 TOTAL ADDRESSABLE MARKET

Marketing intelligence or data is essential to support a confident decision making process when determining the market opportunities and market penetration strategy. The opportunities to be realized are those related to the needs and wishes of the Hospitality customers. Therefore, the goal is to translate the available data into better decisions that will lead to the development of meaningful total lighting propositions creation.

The Total Addressable Market (TAM) for a specific market is the amount of annual revenue, expressed in Euros per year, which the related business would earn if a market share of 100% was achieved.

Philips Lighting clusters the European countries as shown in Table 7.2.

Iberia	Spain Portugal
IIG	Italy Greece
UK & Ireland	UK Ireland
Benelux	Netherlands Belgium Luxembourg
Nordic	Norway Denmark Sweden Finland
France	France
DACH	Germany Switzerland Austria
CEE	Czech Republic Hungary Slovakia Bulgaria Moldova Romania Croatia Serbia Slovenia Poland Lithuania Latvia Estonia

TABLE 7.2 PHILIPS LIGHTING CLUSTERS IN EUROPE

To determine how many end users fit the described user profile, a bottom-up analysis based on primary market research has been conducted.

Within the Hospitality market, **hotel chains** are the key end users for Philips Lighting. In Europe, with a current offer of over 1.9 million rooms and a pipeline of over 135,000 new rooms, chained hotels offer a sizable business opportunity for Philips in both the new and the retrofit lighting projects market.

	Number of hotels	Number of rooms	Average number of rooms per hotel	Percentage of total rooms
Luxury (5-star)	315	42,193	134	2.1%
Up-market (4-star)	2,890	512,399	177	25.8%
Mid-market (3-star)	6,420	900,221	140	45.4%
Economy	4,872	431,046	88	21.7%
Budget	1,363	99,312	73	5.00%
TOTAL	15,860	1,985,171		100%

TABLE 7.3 HOTEL CHAINS IN EUROPE

7.3 SERVICEABLE AVAILABLE MARKET

Within the total chain market, **luxury, up-market and mid-market** hotels, which represent 73% of the total chained market, is selected as target segment for complete lighting solutions. This hotel segment provides a possible market of 9,625 hotels (1,454,813 rooms).

Luxury hotels represents only a small share of the total chained properties in Europe, accounting for less than **2%** of the total number of available rooms. The involvement of individual, local stylists and designers in the choice of the solutions is much more significant than in other segments of the market.

The **upscale** segment represents about **26%** of the total offer of rooms in Europe. The upscale market is the most diversified in terms of brands and served customer sub-segments. Properties keep individual design although the brand concept guidelines are more standardised than in Luxury hotels. In this segment, it is still the architect to be a key solution specifier as he/she is responsible for the translation of the concept into a solution.

The **midscale** is largest in Europe, accounting for over **45%** of the total offer of chained hotel rooms. In midscale refurbishment processes, the on-site architect is more constrained in the design solutions by specific brand guidelines.

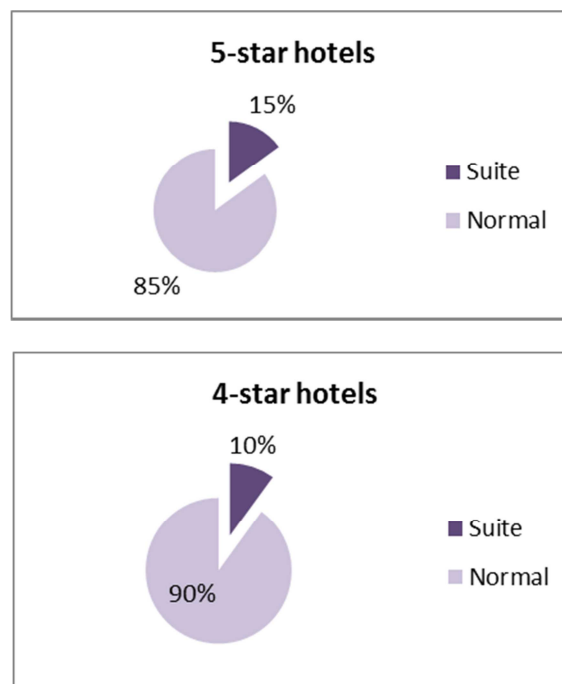
Additionally, the European hotel development pipeline comprises 816 hotels totalling 135,006 rooms, according to the September 2013 STR Global Construction Pipeline Report. The total active pipeline data includes projects in the Construction, Final Planning and Planning stages but does not include projects in the Pre-Planning stage.

Among the markets in the region, United Kingdom reported the largest expected supply growth (+25.3 %) if all 3,451 rooms in the total active pipeline open. Six other markets reported significant expected growth:

- Moscow, Russia (+18.3 % with 7,090 rooms)
- Istanbul, Turkey (+16.7 % with 6,188 rooms)
- London, U.K. (+14.2 % with 16,583 rooms)
- Amsterdam, Netherlands (+11.7 % with 3,537 rooms)
- Birmingham, U.K. (+11.7 % with 1,170 rooms)
- Edinburgh, U.K. (+10.8 % with 1,252 rooms)

In order to size the **guest room value propositions total addressable market**, a good understanding on guest **room categorization between normal and suite** is given in Figure 7.2. A suite in a hotel or other public accommodation denotes a class of luxury accommodations. Many properties have one or more honeymoon suites, and sometimes the best accommodation is called the presidential suite. Suite rooms are meant to distinguish, which offers a great opportunity for Philips to deploy its solutions in this market.

Suites offer multiple rooms, with more space and furniture than a standard hotel room. In addition to one or more beds and bedroom fixtures, a suite includes a living room or sitting room, sometimes with a couch that converts into a bed. Dining, office and kitchen facilities are also added in many suites. Some properties offer only suites. In addition to the luxurious suites, regular suites are particularly marketed to business travelers who appreciate additional space and may use it to host small meetings or entertain clients. The following pie charts show assumption on the average ratio of suite rooms in 3-, 4- and 5-star hotels [8].



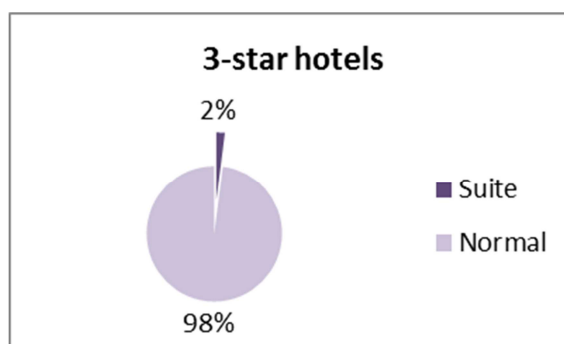


FIGURE 7.2 NORMAL AND SUITE RATIOS AMONG 3-, 4- AND 5-STAR HOTELS

When applying these ratios to the overall number of rooms in Europe shown in Table 7.3, the following number of suites and normal rooms obtained is shown in Table 7.4.

5-star	Suite	6,329
	Normal	35,864
4-star	Suite	51,240
	Normal	461,159
3-star	Suite	18,004
	Normal	882,217
Subtotal Suite		75,573
Subtotal Normal		1,379,240
Total		1,454,813

TABLE 7.4 NUMBER OF SUITES AND NORMAL ROOMS

The next step is to split the total number of **suite and normal rooms into the 3 different value propositions** (*Energy, Comfort and ComfortPlus*), see Figure 7.3 and Figure 7.4. These splits are based on the following estimations and are indicative values in order to illustrate the business model – not representing fully accurate numbers.

Five-star hotels want to differentiate themselves. Therefore, they typically offer personalized experiences such as rooms for business travelers, women, families, etc. High adoption rates for the *ComfortPlus* and *Comfort* propositions are assumed for the suites. For the large number of normal rooms in a 5-star hotel (85% of the total) seventy percent of *Comfort* proposition adoption rate is assumed, with no adoption of *Energy* proposition.

The assumed number of suite rooms in a **four-star hotel** that would implement the *ComfortPlus* is 10%, therefore implementing *Comfort* and *Energy* propositions in the majority of the cases. In the normal rooms no *ComfortPlus* propositions are assumed. *Energy* proposition (based on re-lamping) would be very high in this case, together with *Comfort* (re-lamping + controls + some controls panels).

Three-star hotels have a very limited number of suites. For these, it is assumed that 50% would implement a *Comfort* proposition. In normal rooms only 10% would be *Comfort*, having instead a large implementation of *Energy* solutions (90%).

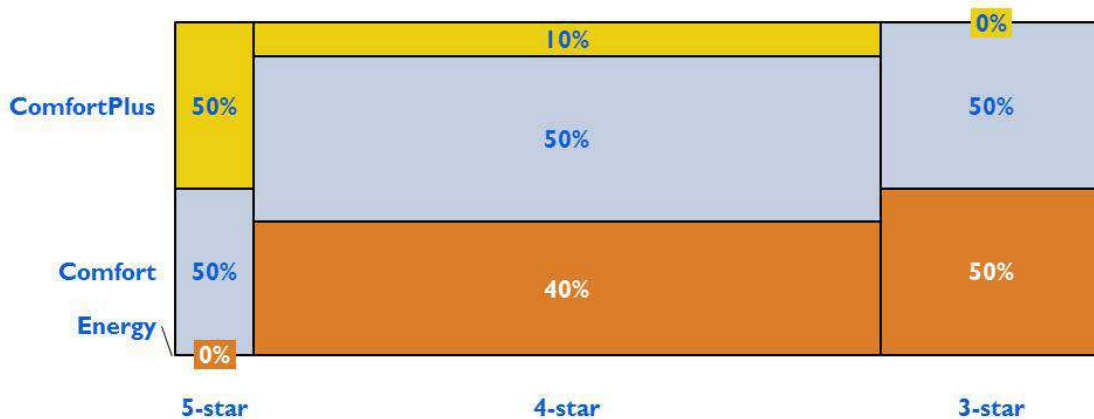


FIGURE 7.3 PROPOSITIONS ADOPTION AMONG SUITE ROOMS



FIGURE 7.4 PROPOSITIONS ADOPTION AMONG NORMAL ROOMS

Different strategies can be followed when identifying the prices that customers would be willing to pay. Some examples are:

- **Cost-plus pricing:** set the price at the production cost plus a certain profit margin.
- **Target return pricing:** set the price to achieve a target return-on-investment.
- **Value-based pricing:** base the price on the effective value to the customer relative to alternative products.
- **Psychological pricing:** base the price on factors such as signals of product quality, popular price points, and what the consumer perceives to be fair.

Selling solutions creates **opportunities** for **value-based** rather than cost-plus pricing. This is also preferred because it starts from the customer's view and value. A solution creates extra value and should be integrated, offering a specific combination of products/components that build a desired effect. An example of creating value beyond the sum of separate products is the combination of energy saving light bulbs in combination with a master switch increasing guest's comfort in their rooms. In this scenario, the solution could be disaggregated by the customer, whom would choose only parts of the offer. Also, competitors find it difficult to bid against customized solutions.

However, selling solutions has several **difficulties**: they cost more to develop, have longer sales cycles, and demand a wide knowledge of the customers' businesses. The

economics of a solution differ from those of a product because the high level of customization and integration. The initial work involved in assessing the market and pulling together a solution can also be considerable. Also, because several business units are needed to package the solution, their need for cooperation increases interaction costs.

In order to reveal the **value** of these solutions, the knowledge of several people within the Philips Lighting organization has been gathered. Therefore, the value levels reflect the level of investment needed for each level of solution (Energy, Comfort, ComfortPlus). For **confidentiality reasons** the values are given in **arbitrary units** and normalized figures (i.e., not in Euros).

	Value (arbitrary units)
Energy	1 / room
Comfort	10 / room
ComfortPlus	20 / room

TABLE 7.5 PROPOSITIONS PRICES (ARBITRARY UNITS)

The defined End User Profile and the value-based pricing give enough specificity to make a first-step calculation of the TAM size for the Europe chain hotel market as shown in Figure 7.5.

Two other assumptions have been taken into account:

- 80% of the market that has not upgraded their lighting systems to LED, and
- 50% of the existing hotels will be renovated in the following 7 years.

Meaning that 40% of the market is actually the realizable market (see Figure 7.5). These assumptions result in a TAM of 185.300 units (44.400 of *Energy*, 134.200 of *Comfort* and 6.600 of *ComfortPlus* solutions).

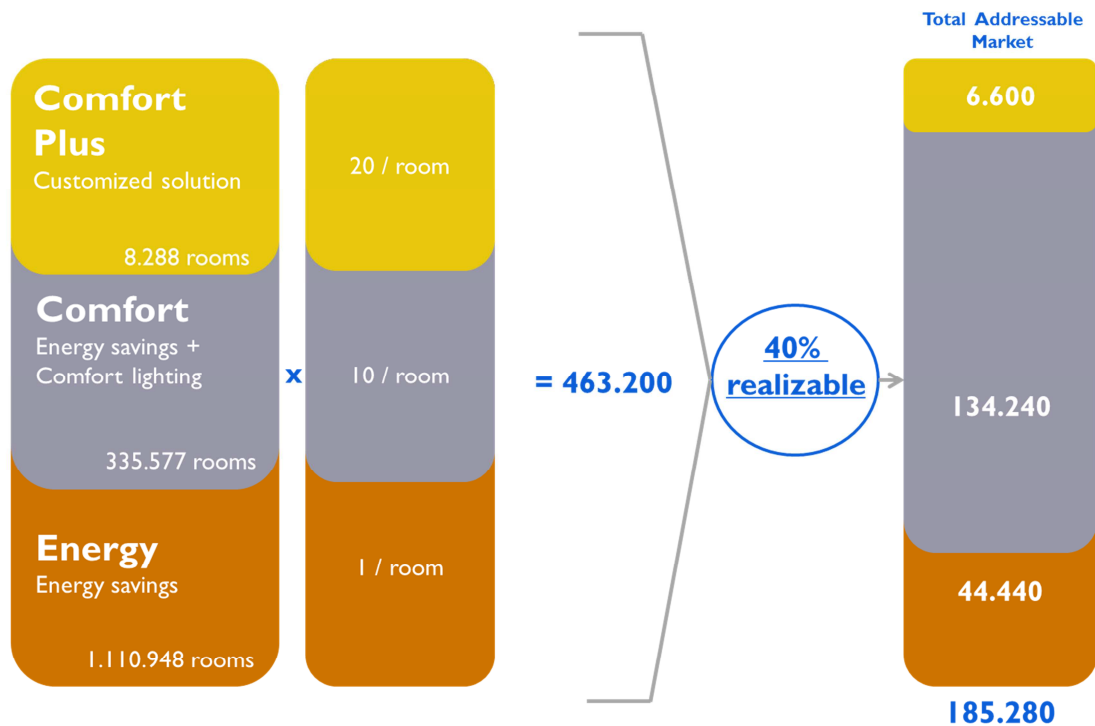


FIGURE 7.5 TOTAL ADDRESSABLE MARKET SIZE FOR THE EUROPE CHAIN HOTEL MARKET (ARBITRARY UNITS) CHANGE

7.4 SERVICE OBTAINABLE MARKET

Market share is key indicator of market competitiveness, reflecting how well a firm is doing against its competitors. This desired asset enables managers to judge not only total market growth or decline but also trends in customers' selections among competitors.

The Philips Lighting market share ambitions depend on the level of the propositions (*Energy, Comfort and ComfortPlus*). Since the first level of solution (*Energy* proposition) is based on only LED lamp replacement, the market share ambition in this case is based on the previous year's LED lamps sales. In 2012, Philips Lighting was the global market leader in terms of lighting sales. Market share is calculated by taking the company's sales over the period and dividing it by the total sales of the industry over the same period.

$$\text{Market share (\%)} = \frac{\text{Philips Sales Revenue (EUR)}}{\text{Total Market Sales Revenue (EUR)}} \times 100 \quad (1)$$

Considering the results in Figure 7.5, the following conclusions can be extracted regarding the potential possible future market share and revenue.

- *Energy* solutions (based on re-lamping) capture approximately one third of the total potential revenue, whereas
- Other two thirds could be captured with *Comfort* and *ComfortPlus* levels of solution – complete lighting solution concepts that include lamp replacement, consumer luminaires, temperature and blind control, control panels, master switch, lighting dimming channels, cove color lighting, presence detection and integration with Building Management System.

7.5 COMPETITION

When analyzing Philips Lighting solutions competition in the Hospitality market, there are two kinds of competitors: lighting competitors and controls competitors.

7.5.1 LIGHTING (LED-BASED PRODUCTS) COMPETITORS

Among the lighting competitors group, three different categories of companies are intensifying their presence:

- Traditional luminaire players moving into systems & services (e.g., Osram and Zumtobel)
- Large electronics players entering the LED lighting market (e.g., Samsung, LG and Toshiba) especially with LED technology.
- Asian players expanding globally (e.g., Panasonic and Sharp)

Although these competitors have a different presence per country, a global overview is given below.

- **Osram:** Osram has a global presence, and is able to offer global deals. Osram acquired Siteco to include luminaires in their portfolio. They have a dedicated Hospitality approach; Hospitality is one of the main applications on their website, with Hospitality case studies and a Hospitality brochure. Osram's online tool *Line Consultant* includes a hotel lobby environment (see Table 8.2).
- **Zumtobel:** Leading European manufacturer of professional indoor and outdoor lighting, lighting management systems and lighting components as well as LED and OLED technology. Headquartered in Austria and currently strengthening its solution portfolio. Dedicated Hotel and Wellness section on their website along with nine reference Hospitality case studies.

- **GE:** Hospitality is not listed as one of the industries they operate in, but they have products for architectural lighting, lighting controls, and LED Replacement Lamps (including candles, bulbs, etc.). There are five Hospitality lighting case studies on their website. GE is not as strong in Europe as in the United States.
- **Samsung:** The South Korean multinational conglomerate company is still not very active in Europe but Philips' Hospitality Key Account Managers already encountered them as potential competitors in some cases. Samsung follows an end-users direct approach strategy in Japan, which could also be successful for penetrating the Hospitality market in Europe. They also apply an aggressive approach towards wholesale. Currently, they have a limited (11 LED bulbs) range of LED lamps products.
- **LG:** Headquartered in Seoul, South Korea, LG is the fourth-largest company of its kind in South Korea, following Samsung Group, Hyundai Motors Group and SK Group. Although LG is rather a late entrant into the LED business, it has rapidly gained ground. Also, LG is moving their component focus onto the general illumination market, seeing their future in lighting applications (source: LEDs Magazine, retrieved June 2013). No dedicated Hospitality section on their website and small portfolio.
- **Toshiba:** Multinational engineering and electronics conglomerate headquartered in Japan. Toshiba has already acquired a solid base in Europe, but doesn't have a dedicated Hospitality section on its website. Toshiba wants to expand within the professional market and are being successful on this in countries such as Spain, France and Germany. Toshiba did the re-lamping for Louvre museum in Paris and are now using it as reference project to acquire more projects. Within their professional portfolio they offer replacement lamps (bulb-shaped lamps, candle lamps, spherical lamps, and wide light distribution lamps), reflector lamps, spotlights, downlights and outdoor lighting.
- **Panasonic:** The Japanese multinational electronics corporation has a limited portfolio - 19 LED lamps within their professional portfolio. Panasonic is looking for opportunities to expand abroad. They already have a dedicated local website per country.
- **ERCO:** Based in Germany, ERCO is a medium-sized lighting company, with a strong approach reaching creative specifiers. ERCO has a wide product portfolio and develops total lighting concepts and control systems for buildings and urban landscapes. ERCO has a dedicated Hospitality section on their website and hundreds of Hospitality case studies.
- **Fagerhult:** Fagerhult Group is a Swedish company producing luminaires. The Fagerhult Group is the largest lighting group in the Nordic region and a leading force in Europe. They don't have a dedicated Hospitality section on their website but they do have a wide range of products.

7.5.2 CONTROLS COMPETITORS

Among the controls competitors an overview of the ones that have developed **dedicated guest room controllers** is given below.

- **Zumtobel**, also listed as one of the lighting competitors, has a competitive controls portfolio. The ZBOX-controller, is a multifunction based unit lighting management dedicated controller for hotel rooms that has switching and dimming functions. The ZBOX can also control one colour lighting group, one motor channel for blinds, the key card and access system and scene setting. Works as a stand-alone or networked solution. The ZBOX circle control points has individual buttons for controls of brightness and blinds as well as three scenes buttons and presence/absence scene button.
- **Schneider**: Component style of system for hotel room control (SE7000 Room Controller). Supports a range of panels, sensors, card readers, door sensors & digital thermostat. Rooms connected through Ethernet and room devices via LON, KNX & wireless. Control concept focused on:
 - **Lighting control**: starts/stops/dims electrical lighting only if people are present and current brightness
 - **Heating control**: adjusts the requested temperature and sets the heating or cooling to standby mode whenever the room is unoccupied or a window is opened
 - **Sunblind control**: activates the sun blinds depending on the current temperature
- **Siemens**: Specialised equipment for hotel rooms and software for hotel room booking management. Supports a range of matching control panels, digital thermostat and power points. Room controllers communicate directly to BMS via KNX & communicate to room devices via RS485. Control concept focused on climate control for energy management. Three level of system offering:
 - **Standard level offering**: Fan coil, VAV radiator temp control
 - **Advanced level offering**: Fan coil, radiator, VAV & chilled and standard lighting/blinds
 - **Luxury**: Fan coil & radiator temp control, standard light/blind, guest access and guest amenities

Software management tools:

- Meeting and conference room booking
- Hotel rooms over view
- Single room view and over ride

- **ABB:** Specialised equipment for the hotel rooms & software for hotel room booking management. Two levels of system offering:
 - **Room Master Basic**
 - **Room Master Premium**

The offered solutions allow switching of lighting with optional external units required for dimming. Room controllers communicate directly to BMS via KNX and to control panels within the room Thermostat uses ABB bus. Control concept focused on climate control for energy management

- **Inncom, Honeywell:** Switching and dimming outputs available. Component system offering. Supports a range of custom glass control panels, bed side panels, door switches, electronic locks, infrared occupancy sensors and digital thermostat/lighting control panels. Room controllers communicate directly to BMS (for guest status changes to the front desk and the back office) via Ethernet and communicate to room devices via RS485, IR or Zigbee. Control concept focused on climate control for energy management. The hardware is a component based system that can be built up with individual modules including a relay module (one to five relay channels), dimming (two channels), and fan control and coil unit outputs. Four levels of systems:

- **Eco-conscious hotels**
- **Full service hotels**
- **Limited service hotel**
- **Luxury hotel**

- **Lonix:** is a Building Management System (BMS) company with advanced BMS software component system offering tailored for hotel room control. Limited range of control panels and digital thermostat. All devices communicate using LON. Control concept focused on climate control for energy management. Three levels of systems plus optional features:

EcoSaver

- Intelligent temperature controls
- Energy saving functionality
- Preset temperature based on occupancy
- Temperature set point changed with room status
- Temperature control panel for set-point deviation and fan speed control
- Cooling off when window open
- Lights off when unoccupied
- System monitoring and trending

ComfortPlus

- Full-scale lighting controls: on/off , dimming, scene controls
- Bedside panel for easy adjustment

ComfortPremium

- Customized solution with optional features

Optional features

- Curtain controls, open/close, closed automatically upon leave
- Consumption metering: clean water, chilled water for A/C, electricity

- Door locking system
- Browser User Interface in Internet Protocol Television (IPTV)
- **Crestron:** Offering three levels of hotel room control system. Large range of portable touch screens, wireless control panels, wireless relay, dimmers, blind control, and wireless digital thermostat. E-Control2 software for site wide control. Rooms connected through Ethernet and room devices via ZigBee. Control concept focused on customer comfort and integration options. Three levels of systems:
 - Standard Room**
 - Lighting dimming
 - Climate control
 - Deluxe Room**
 - All standard room options
 - Shade and drape control
 - Touch screen
 - Suite**
 - All Deluxe room options
 - AV hardware
 - Large touch screen

7.6 CUSTOMERS

The main challenge for Hospitality business' decision makers is how to make the right investment decision regarding cost, sustainability, and business and societal impact. Four main stakeholders (with different buying decisions) have been identified: the general manager, the engineering or local facility manager, the brand (or marketing) manager, and the creative specifier.

General Manager

- **Profile and buying decisions:** Looking for innovations that help them differentiate their hotel and reduce the operational costs.
- **Key benefits:** Reduce energy running costs, minimize environmental impact, improve guest experience and increase guest loyalty.
- **Unmet needs by the market:** Intelligence, which in most of the cases has already been installed, means more control on operational costs. However, lighting is not included in most of the cases.

Engineering Manager / Local facility Manager

- **Profile and buying decisions:** Looking for maximizing energy savings and keeping the facilities as clean, appealing and safe as possible. Allocates the renovation budget and needs information on: current and new available solutions, technical specifications of available products, logistics, and price and energy consumption.
- **Key benefits:** Increase room management, reduce maintenance.

- **Unmet needs by the market:** A supplier that understands their business. Looking for simple and reliable solutions that require no highly skilled staff to maintain it.

Brand (or Marketing) Manager

- **Profile and buying decisions:** Create or adopt easy to implement solutions that are unique to the brand. Looking for energy saving solutions to support the creation of an annual sustainability report. Looking for ways to increase turnover.
- **Key benefits:** Brand positioning, improve guest experience and increase guest loyalty.
- **Unmet needs by the market:** Looking for a partner/supplier that can interact on various levels and aspects: creative design, technical design, flexibility, customization and implementation.

Creative Specifier

- **Profile and buying decisions:** Seeking for visual sources of inspiration, including new technologies and new lighting effects, as well as technical specifications and logistics. They need to comply with all rules and regulations and meet technical requirements. Designers are faced with space, budget and schedule constraints. Creativity plays a definite role in developing a new product that is inviting to guests and complimentary to the brand.
- **Key benefits:** Brand positioning and create unique design.
- **Unmet needs by the market:** Current product portfolio does not attract this target group, no visual identity. Looking for high levels of customization.

For a better understanding of the **decision making process** among the different stakeholders (creative specifier and general, engineering, facility, brand and marketing manager), an example of the overview of this process for **new and refurbished hotels has been schematized** (see Figure 7.7 and Figure 7.8). The key decision makers (and therefore, the ones that Philips should address) are the ones with a wider perimeter line as shown in Figure 7.6.

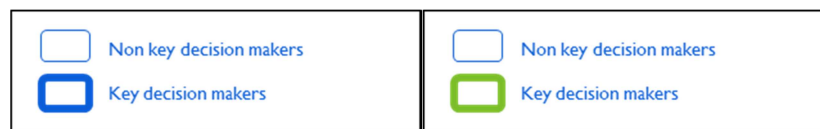


FIGURE 7.6 KEY AND NON-KEY DECISION MAKERS LEGEND

For **existing buildings**, Philips offers the coordination of a quick LED lamp replacement with no need for renovation required. For hotels looking for a more significant refurbishment, Philips can upgrade the luminaires as well, or renovate the whole lighting system. For **new buildings or deep renovations projects**, Philips creates highly sustainable lighting designs that maximize a hotel’s appeal and future-proofs it in terms of energy use.

As the hotel industry is starting to climb back to its pre-recession levels, renovations are more prevalent than new construction. As a part of this recovery, owners and developers are looking to convert and renovate existing properties. One of the downsides of the majority of the cases is that, if hotels are filling the rooms up on a regular basis, they are very unlikely to shut the doors for a major overhaul and stop the revenue stream coming in. Many may opt for **small-scale renovations**, doing a number of guestrooms at a time and keeping inventory primarily intact.

An issue that could spur additional renovation activity is the industry's continued struggle to raise rates. Some hoteliers, who do have available capital, may see a renovation or additional Capital Expenditures (CapEx) as an opportunity to charge more for their rooms. CapEx are incurred when a business spends money to purchase fixed assets or to add value to an existing fixed asset. In accounting, capital expenditures are added to an asset account, thus increasing the value of the asset.

In an increasingly competitive battle for market share, newly renovated rooms and public spaces can be **a difference maker for many hotels**. Maximizing CapEx spends positively impacts on the value of the hotel and therefore increases guest satisfaction. Issues that are likely to lead to at least small scale renovations, or additional CapEx on the part of hotel owners, **include the continued evolution of technology, as well as the momentum of the sustainability movement**.

According to results of the Voice of the GM Survey 2013, hotel General Managers report having higher operating and purchasing budgets than the previous years. The largest categories General Managers said they are spending on during 2013 are wireless infrastructure including bandwidth, **lighting**, televisions, telephones, in-room entertainment and property-management systems.

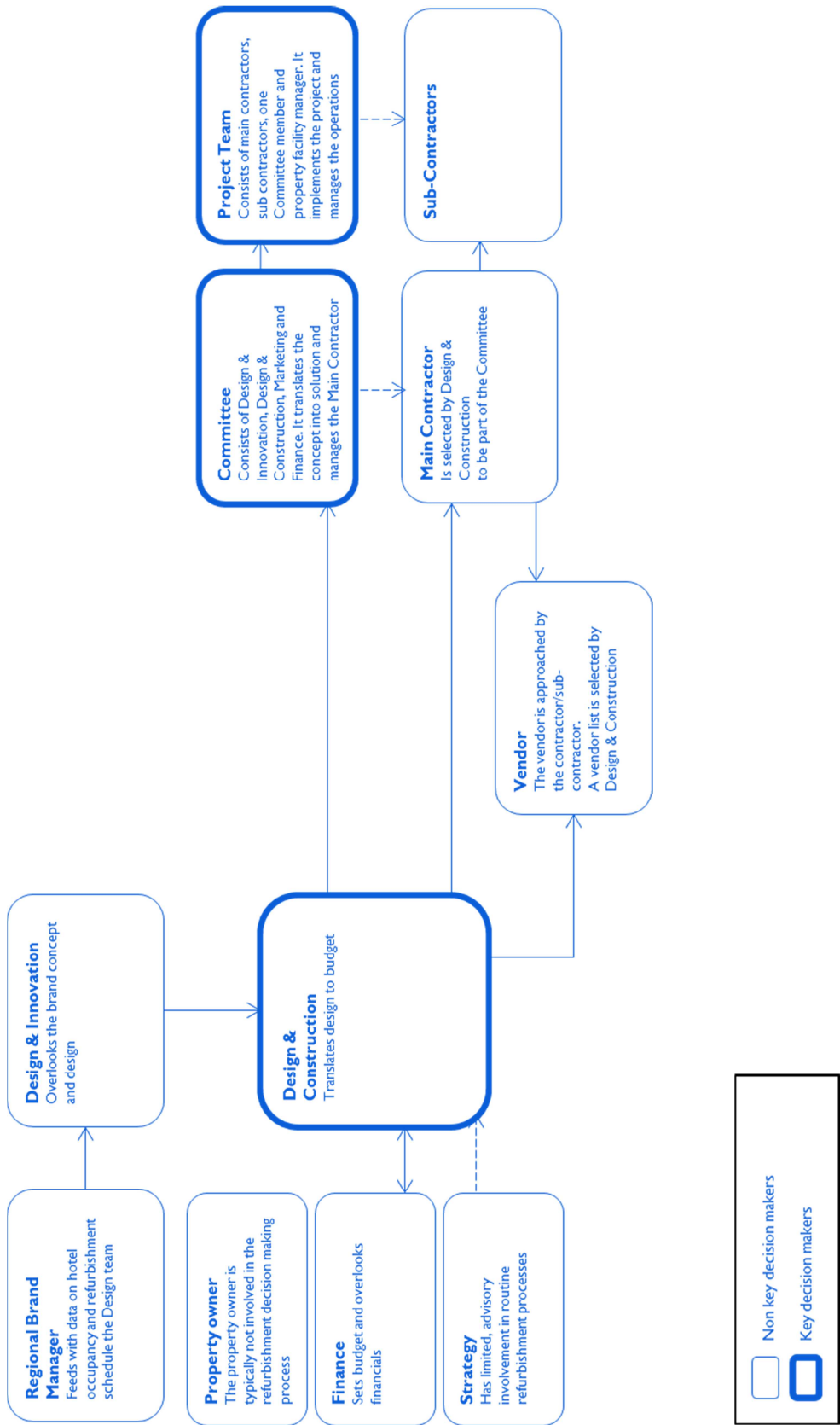


FIGURE 7.7 DECISION MAKING PROCESS IN REFURBISHMENT

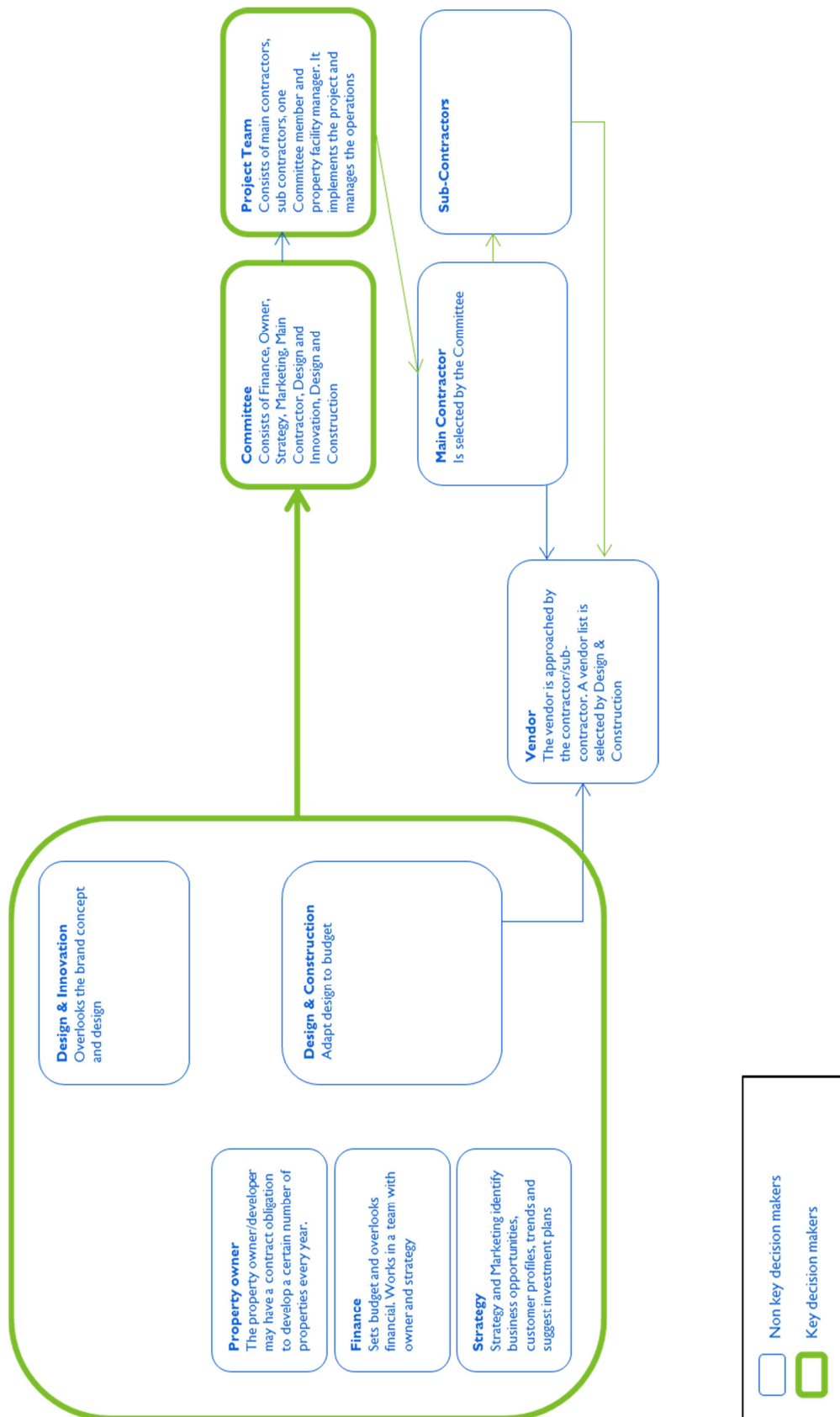


FIGURE 7.8 DECISION MAKING PROCESS IN NEW CONSTRUCTION

7.7 FINANCING MECHANISMS

There are few industry sectors in which lamps burn as long and continuously as in hotels. As explained in Chapter 4, lighting is one of the costliest energy uses in every hotel. On top of identifying the best investment options to reduce the energy consumption, it is also essential to invest in the energy technology solutions that offer the best Return of Investment (ROI).

There are many financing sources for energy efficiency projects[9] and alternatives so hotels can obtain capital for the up-front costs.

- **Equity[10]**

Equity can take the form of direct investment of one's own resources and capital, or as third party capital inputs, e.g., in the form of risk capital by venture capital funds or simply wealthy families. Using the hotelier resources as equity is the simplest method of project financing. This method makes sense if the hotel has a strong balance sheet and sufficient cash reserves. With this form of equity, all cost savings realized from the upgrade are immediately available, and the hotel is able to realize the tax benefit of the equipment's depreciation. However, an opportunity cost occurs, since the hotel has no longer that capital available for other investments. This financing method is good for relatively inexpensive and simple efficiency measures that are likely to pay for themselves in about a year.

- **Loan**

A loan may be obtained to finance a project. Before financing the project, a bank may ask for a personal guarantee from the hotel owner. The lender's goal is for the client to make minimum payments dependably, so lenders may require a down payment of up to 50% or more.

- **Operating lease[11]**

Under an operating lease, the lessor owns the equipment and claims any tax benefits associated with its depreciation. At the end of the contract term, the customer (hotelier, in this case) can purchase the equipment at fair market value (or a predetermined amount), renegotiate the lease, or have the equipment removed. An operating lease is also known as an "off-balance-sheet" lease.

- **Performance contracting**

This option is attractive to the customer because it requires no up-front cost, since the project is paid for out of the energy savings from the efficiency project itself. An Energy Service Company[12] (ESCO) provides the financing and assumes the performance risks associated with the project. Until the project has been fully paid for, the ESCO owns the upgraded equipment. That means that the equipment asset and debt do not appear on the customer's balance sheet.

Energy Performance Contract (EPC) allows for evaluation of the system from the initial phases of the project implementation, taking advantage of the functionality and capturing energy and maintenance savings over the contract lifetime.

7.8 RETURN ON INVESTMENT ANALYSIS

To conduct a Return on Investment (ROI) analysis it is necessary to do a Cash Flow (CF) projection, estimate the Internal Rate of Return (IRR) and the Net Present Value (NPV).

The CF analysis gives the yearly costs and savings[13]. Operating cash flows include all operating and maintenance expenses, interest paid, income taxes and energy savings over the lifetime of the equipment. The investment CF includes capital expenditures.

The discount rate, which is influenced by a wide variety of factors, is used to account for the risk inherent in an investment. This rate used for computing present values, reflects the fact that the value of money depends on the time in which the cash flow occurs, and is the criterion for determining if an investment passes the profitability test.

For confidentiality reasons the calculation values are given in arbitrary units (i.e., not in Euros). In order to do the financial analysis example shown in Table 7.6, the following values have been considered:

Hotel area: 37,000 m²

Hotel tier: Upscale (4 star)

Number of rooms: 300

Discount rate: 8% (recommended discount rates for energy efficiency projects are between 3% and 12%)[14]

Lighting use from the total energy use in a hotel: 12%

Annual average energy use in a hotel: 320 kWh/m²year

Electricity price: 0.08 EUR /kWh[15]

Average size of a room: 40m²

Size of common areas: 1600m²

Average LED lighting consumption 9.75 W / m²

Measurement and Verifications (M&V): 2,000 (to ensure a correct and transparent calculation of realized benefits, Philips can work together with the hotel to define a robust Measurement and Verification process).

Improvement	Cost (arbitrary units)	Savings (arbitrary units)	Payback (years)
Lighting	150,000	52,500	2.9
Controls	450,000	112,500	4.0
Total Value	600,000	165,000	3.6

TABLE 7.6 FINANCIAL ANALYSIS EXAMPLE

The payback, which measures the speed with which an investment can be converted into cash, indicates the amount of time in years necessary for future cash flows to return the initial investment.

Years	year 1	year 2	year 3	year 4	year 5	year 6	year 7
Investment	-600,000						
Savings		165,000	165,000	165,000	165,000	165,000	165,000
Costs		-15,000	-15,000	-15,000	-15,000	-15,000	-15,000
M&V		-2,000	-2,000	-2,000	-2,000	-2,000	-2,000
Total	-600,000	148,000	148,000	148,000	148,000	148,000	148,000
Present Value	-600,000	137,037	126,886	117,487	108,784	100,726	93,265

TABLE 7.7 SEVEN YEARS CASH FLOW AND PRESENT VALUE

According to the CF calculations shown in Table 7.7, the NPV obtained in this analysis after seven years are 84,186 arbitrary units with an IRR of 19%.

The NPV is the total net cash flow that a project generates over its lifetime, including upfront costs, with discounting applied to cash flows that occur in the future[16]. NPV indicates what a project's lifetime cash flow is worth today. When the NPV is greater than zero it is considered to be a good investment since it means that the achievable energy savings are sufficient to repay the original investment and receive a financial return on the initial investment equal or superior to the required rate of return (the discount rate).

The IRR is the interest rate that equates the present value of expected future CFs to the initial cost of the project. An investment is profitable if the IRR is higher than the depreciation rate (the higher the IRR, the more desirable).

8 COMMUNICATION FRAMEWORK

As stated in the objectives of this report, the goal of this assignment is to develop a Hospitality solutions' communication framework. Various reasons explain the need for this framework. First, as Philips is moving from a product provider to a total solution partner, there is a need to establish a structured communication framework. Second, internal stakeholders, for example Philips sales force, stated their need of guidance through the consultative solution selling process. In the first section of this chapter an analysis of the existing Hospitality communication plan is given. Later in this chapter, three different (new) communication tools are studied. At the moment this report is being written, these tools are in the concept phase, which can also be understood as prototypes.

8.1 ANALYSIS OF THE EXISTING COMMUNICATION PLAN

Marketing and e-marketing collateral is the collection of media used to support the sales process and make it more effective. The production of marketing collateral is important in any marketing communication plan. Marketing collateral differs from advertising in that it is used later in the sales process, usually when a potential customer has been identified and the sales force is making the first contacts.

Existing Philips Lighting Hospitality online and offline sales support tools and activities include:

- **Segment brochure**

The Hospitality brochure provides an overview of suitable lamps and professional luminaires for each hotel area. The brochure covers the following application areas: Reception and lobby, Corridors and other areas of transition, Guestrooms, Luxury rooms and suites, Bars and restaurants, Wellness areas, Conference and meetings areas and Parking and outdoor area. The brochure's objective is to inspire customers with people focused and meaningful innovations. This is supported with testimonials and real projects. The brochure aims to create solution-driven messages which will lead to real and lasting partnerships with end users. The last edition of the brochure was published in September 2012[17].

Target groups: Hotel owners and managers.

Main message: 'Philips Lighting solutions can meet the changing needs of Hospitality customers and enhance people's lives with light'.

Goal/use: The brochure is usually left behind as reference material.

The brochure includes the following:

- Introduction story: "See what light can do for your guests", "Feel at home", and "Feel responsible".
- Philips Hospitality Lighting Services

- Product pictures
 - Product descriptions
 - EcoDesign DIM2 regulation
 - Why Philips for LED lamps?
 - Testimonials (with pictures)
 - Area-by-area description and product overview
 - LED alternatives to halogen
 - LED product technical information (Watt, Lumen, Lifetime and Dimmable)
- **Sales pitch presentation**

The sales pitch is a Power Point presentation version of the brochure. The last edition of the brochure was created in July 2013 by the Philips Lighting Hospitality segment Marketing Communication Manager and internally distributed among the Key Account Managers community.

Target groups: Hotel owners and managers.

Goal/use: Used during the sales process.
 - **Online case studies**

Online case studies provide testimonials and real projects information, and can be found at the Hospitality site[18]. Case studies are also segmented by application areas (reception and lobby, corridors and other areas of transition, guestrooms, luxury rooms and suites, bars and restaurants, wellness areas, conference and meetings areas and parking and outdoor areas) and can be downloaded as PDF files. Typically, case studies include a general description about the project and a detailed description of the selected solution. At the moment this report is being written, a total of 64 case studies can be found online.

Target groups: Hotel owners, managers and creative specifiers.

Goal/use: Provide proof and give credibility. Case studies are used to give reference to similar projects or customers.
 - **Reference application guide**

The reference application guide is a Philips internal document released on March 2011 (last available version). It aims to support lighting specifiers and architects on the technical level of the selection of lamps and luminaires for a project.

Target groups: Creative specifiers.

Goal/use: Give an idea about how to develop lighting proposals with low energy consumptions and taking into account the aesthetic design aspects at the same time.

The reference application guide includes the following:

 - Product pictures
 - Product descriptions
 - Area by area description and product overview
 - LED alternatives to halogen

- Application examples levels: premium, advanced and standard
- Decorative luminaires solution
- Plan view, product location and DIALux lux scheme

- **High impact movies**

The objective of high impact movies is to inspire. Movies can be found at the Philips Lighting YouTube channel. Example: Philips Lighting Hospitality inspirational movie.

Target groups: Hotel owners, managers and creative specifiers.

Main message: Philips flexible lighting solutions can personalize spaces in a flash, giving hotel guests an experience to remember through the power of light.

Goal/use: Inspire Hospitality customers and show what light can do for their guests. Lighting can energize, soothe and help people interact, making guests feel at home in a hotel environment - whether they're working, chilling out, socializing or moving around.

The following Figure 8.1 shows how often these tools are currently used during the first contact with Hospitality end-users. The conversation in which these tools are being used takes place between Philips sales force and Hospitality customers during the consultative selling process. As explained later in this chapter (Concept validation), this information relates to **15 internal interviews** held among Philips sales force (answers typically include more than one choice/tool).

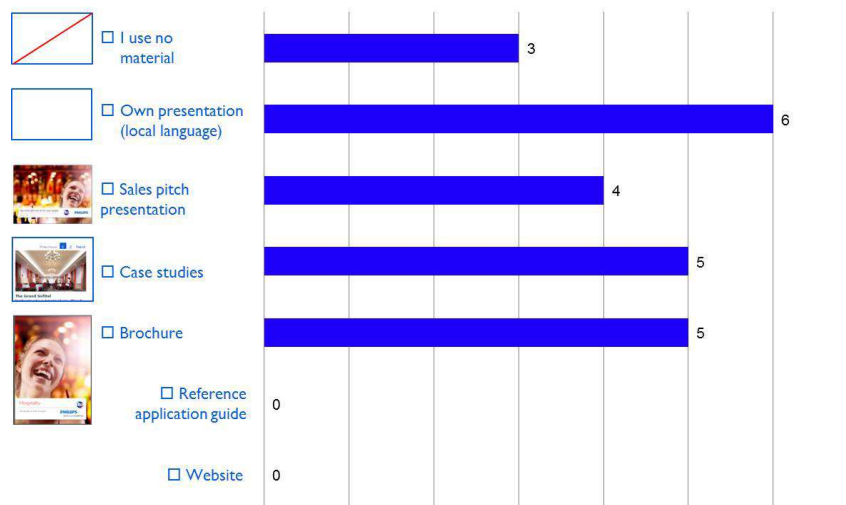


FIGURE 8.1 USED MARKETING COLLATERAL MATERIAL AMONG PHILIPS SALES FORCE

Mainly, the Account Managers use their own presentations when they meet with a customer for the first time. Three of them also mentioned that they don't use any material at all. The official sales pitch presentation (provided by the European Hospitality Marcom Manager) and case studies are the second most used tools. It is important to clarify that all the interviewed stakeholders stated that the brochure is not being used as an inspirational tool but as a leave behind material so that the customer has something on the table to remember Philips. The Reference application guide and the Website are not used among the KAMs interviewed.

Table 8.1 shows the available collateral marketing material of Philips and the competition regarding the Hospitality lighting business. Most of Philips competitors, with the exception of Fagerhult and Lightwild, have a dedicated Hospitality website, case studies and brochure.

	Hospitality segment website	Hospitality case studies	Hospitality brochure
Philips	✓	✓	✓
Fagerhult	✗	✗	✗
Lightwild	✓	✓	✗
ERCO	✓	✓	✓
ZUMTOBEL	✓	✓	✓
OSRAM	✓	✓	✓
GE Lighting	✓	✓	✓
Artemide	✓	✓	✓

TABLE 8.1 PHILIPS AND COMPETITOR'S HOSPITALITY COLLATERAL MARKETING MATERIAL

8.2 DEVELOPMENT OF NEW COMMUNICATION PLAN

Building a communication framework starts by identifying the target audiences and its expectations. Only after this, the key messages on how Philips lighting solutions can solve these expectations can be articulated. In the Hospitality sector, a very diverse audience including General Managers, Facility Managers, Architects, (Lighting) Designers and Brand Managers was analyzed to understand the outside-in problem statement (see Chapter 7). It is also necessary to map the present situation to understand where the Philips Lighting organization currently stands and where managers want to take it: from a product- towards a solution-oriented company (see Chapter 3). Identifying the challenges that the Philips sales force encounters when presenting to customers, is also considered (see Chapter 4).

Taking into account all of this information for the development of new communication tools, two main topics were identified (step 0, Figure 8.2):

- In order to communicate solutions rather than products, enabling cross selling and passing on leads, internal guidance through the sales process is necessary.
- There is a need to establish a fluent conversation with creative specifiers, for example, supporting the sales pitch with renders and visual material to inspire them.

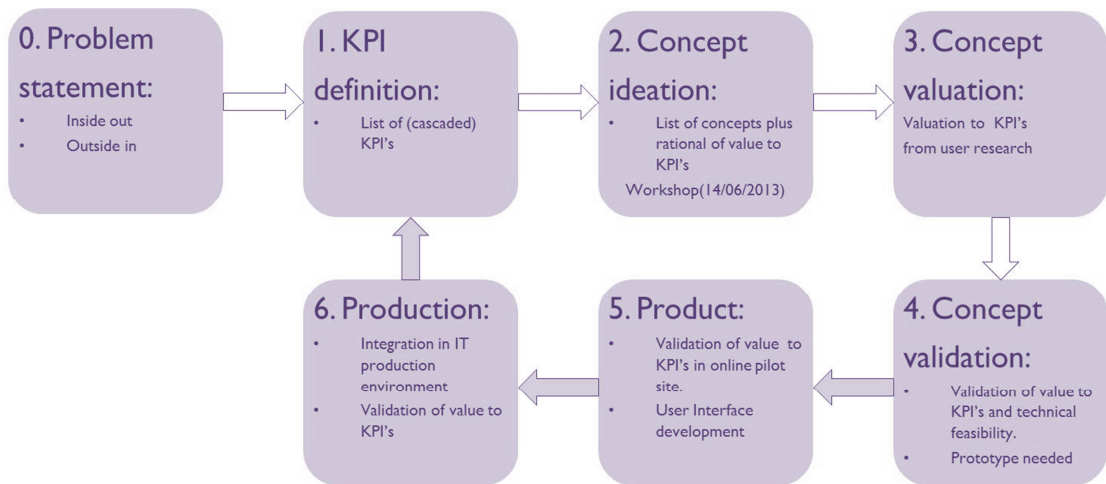


FIGURE 8.2 NEW COMMUNICATION TOOLS' DEVELOPMENT SCHEME

Therefore, following the scheme shown in Figure 8.2, three different visualization tools concepts have been ideated (step 2), valued (step 3) and validated (step 4). Steps 5 and 6 are beyond the scope of this assignment; however, the recommendations extracted from steps 0 to 4 need to be considered.

8.2.1 KEY PERFORMANCE INDICATORS (KPI) DEFINITION

In order to reach the objective (increased turn over and market share) a set of KPIs (Key Performance Indicators) has been identified (step 1, Figure 8.3) that act as leading indicators:

- KPI: number of customers moving from Desire to Attention (AIDAR process, stands for: Awareness, Interest, Desire, Attraction, and Retention)
- KPI: additional sales triggered by new communication tools

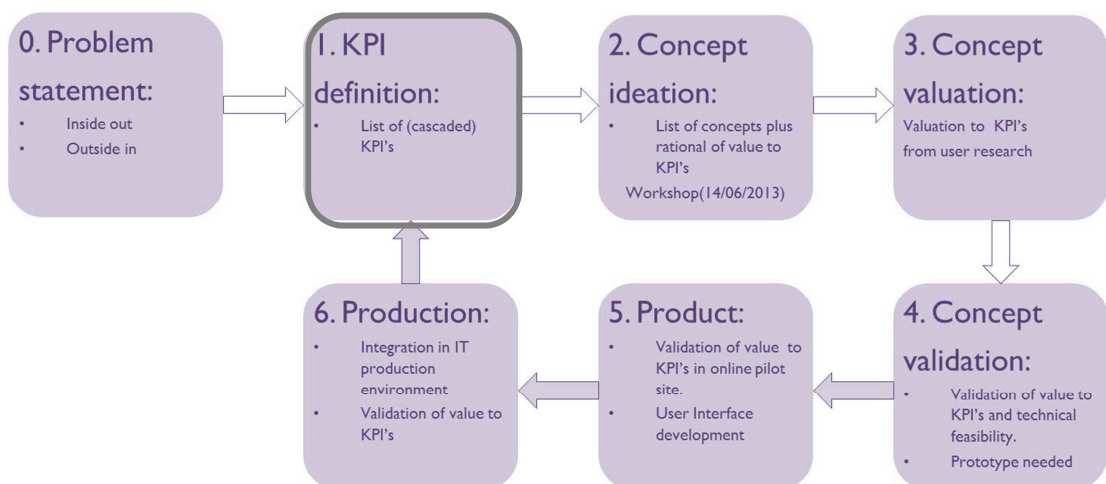


FIGURE 8.3 NEW COMMUNICATION TOOLS' DEVELOPMENT SCHEME: STEP 1

8.2.2 CONCEPT IDEATION

To envision and define how **new communication tools** would look, feel and operate, an ideation workshop took place in June to collect specific details from various internal stakeholders (step 2, Figure 8.3).

Workshop: Concept ideation new communication tools for Hospitality (June 14, 2013)

- **Attendees:** Account Manager Consumer Luminaires, Research Scientist, Virtual Prototyping, Global Systems Communication Manager, International Business Developer Creative Specifiers, Product Marketing Manager Indoor, Retail and Hospitality Business Developer and Hospitality Lighting Application Specialist.
- **Goal:** Define visualization concepts that help our customer understand the influence of lighting on experience at different stages of the sales process. Envision the elements of an idealized future. Define how visualization tools would look, feel and operate. Collect specific details from all stakeholders.
- **To be discussed:**
 - Who are the customer stakeholders?
 - What would they expect?
 - Who would use it?
 - How would they use it?
 - How complex should the concept be?
- **Outcome:**
 - Business development and focus on creative specifiers: architects and lighting designers
 - Focus on controls: showing what light can do
 - Focus on throughput through sales funnel AIDAR, focus on Awareness, Interest and Desire

One of the **conclusions** of the workshop was that special attention to the first three phases of the AIDAR buying process is needed. Also, all the new communication tools discussed during the workshop were related to visualizations.

Currently, the sales force is using power point presentations and brochures which are often highly technical and not inspirational enough. **Visualization tools** would provide a new platform for Philips Lighting sales force to overcome the existing challenges they encounter when presenting total lighting solutions. This kind of tools would help establishing a fluent conversation with creative specifiers and move a higher number of customers to the next sales phase (from Interest to Desire). Using Philips technical expertise, these tools would be developed by lighting specialists that focus on visualizing the essence of lighting solutions. Inspirational examples of solutions would increase customer engagement and show the value of partnering with Philips from the early stages of the solution design process. Therefore, where existing tools don't succeed,

visualizations tools would capture the atmosphere of the initial conversations with the client, and provide guidance to the sales force towards a consultative selling process.

8.2.3 ONLINE VISUALIZATION TOOLS OF COMPETITORS

An overview of Philips competitor's online tools is given below in Table 8.2. The features of these tools have been analyzed (individual lighting control, hotspots, product information, economical savings, energy savings, scenes and scenarios). The 'scenarios' feature denotes how many applications are available (e.g., office, retail, industry, supermarket, hospitality). The 'scenes' feature is understood as the possibility to visualize different light designs (e.g., basic, cool, cozy, trendy) for the same area, room or application. Tools of competitors that focus on the creative specifiers target group, like the Fagerhult or ERCO ones, have this 'scenes' feature and also the possibility to control individual lights. In the contrary, other tools like the OSRAM Light Consultant, aims to provide the energy and economical saving related to two or more lighting designs alternatives.

	Individual lighting control	Hotspots	Product information	Economical savings	Energy savings	Scenes	Scenarios
Philips LAC360	✗	✓	✓	✗	✗	✓	Office, retail, industry, supermarket, hospitality.
Eagerhult	✓	✗	✓	✗	✗	✓	Indoor (cellular and large office, classroom, conference room, corridor), retail (fashion shop, car showroom, media shop, supermarket), outdoor, health and care (ward rooms, corridor)
ERCO	✓	✗	✓	✗	✗	✓	Restaurants, reception, lobby, <u>museum</u> /exhibition room, <u>office</u> , <u>showroom</u> , <u>restaurant</u> , <u>multifunctional room</u>
OSRAM OSRAM tool: Light Consultant	✗	✗	✗	✓	✓	✗	Hotel lobby, classroom, open-plan office, cellular office, call center, production hall, warehouse, shop, shop window, shelf lighting, entrance and outdoor lighting, side street
OSRAM Light-a-home	✓	✓	✓	✓	✓	✗	Kitchen, dining room, living room, hall, bedroom, bathroom, children's room
GE Lighting Toolkit	✗	✗	✓	✓	✓	✗	Healthcare, industrial, retail-high bay, general, warehouse, retail-accent, office
Zumtobel Refurbishment	✗	✗	✗	✗	✓	✗	✓

TABLE 8.2 COMPETITORS' ONLINE VISUALIZATION TOOLS

8.2.4 CONCEPT VALUATION AND VALIDATION

A handful of visualization tools that are seen as most important have been identified. To validate them, a test environment (or prototype) that captures these elements in different clear concepts was built.

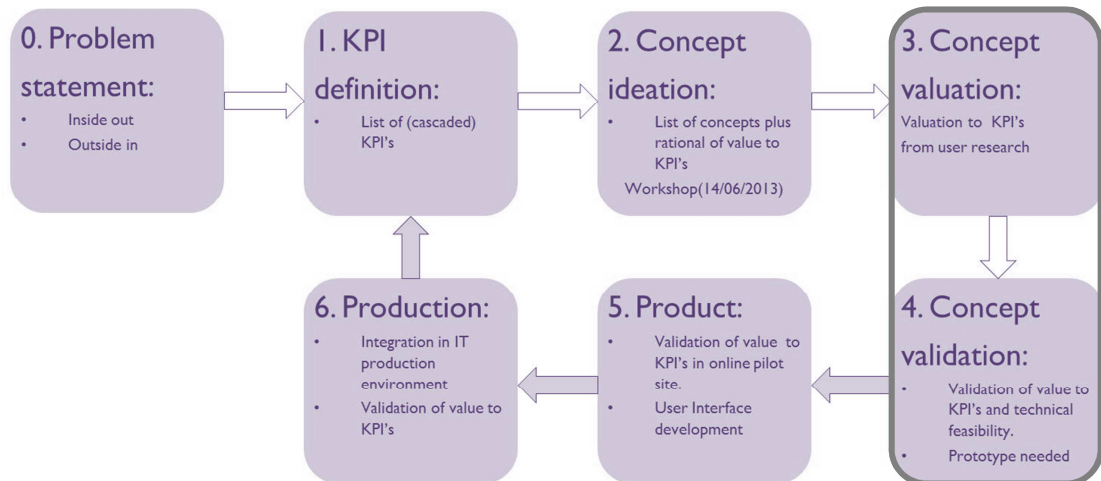


FIGURE 8.4 NEW COMMUNICATION TOOLS' DEVELOPMENT SCHEME: STEPS 3 AND 4

This test environment was presented to 15 internal stakeholders (see Appendix A), most of them Philips Retail & Hospitality Key Account Managers (KAMs).

The ideal Key Performance Indicator (KPI) was to measure the additional sales triggered by visualization tools. However, in this stage, when the tools are in the prototype phase, this cannot be directly measured with the end user (Hospitality customers). That is why, as an intermediate step, an additional KPI was defined. This **intermediate KPI** measures the **potential of the visualization tools from the Philips sales force point of view**. In more detail below, it aims to quantify the value of these tools.

Although this framework is applicable to any segment within the Philips Lighting professional market group, in the validation of visualization tools concepts, Hospitality has been selected as carriers for its broad pallet of applications.

The Essence of Hospitality Lighting Solutions:

- Differentiate your hotel;
- Create inviting and hospitable environment ;
- Maximize room comfort and guest satisfaction;
- Increase occupancy rates and return visits; and
- Reduce maintenance and operation costs.

In this chapter, both the test environment and the collected feedback are presented together.

The first part of the interviews focused on identifying the potential of visualization tools in general. The second part gave more detail of each one of the three concepts (Master Bidbook, Interactive Tool Pre-rendered Rooms and Interactive Tool Real Photographs).

Master Bid Book

In Philips, Bid Books are used in the Arena Professional Lighting Solutions team. Typically printed in A3 size (extra copies in A4 format can be printed for the customer to take along), these books are envisioned as simple tools a medium-high relevance. The Arena Bid Books describe the potential value of the Lighting solutions from the perspective of the different stakeholders: the broadcaster, the audience, the stadium operator and the architect. The goal of this tool is to initiate conversation with the clients and inspire them. They are meant to express experience and emotions. They may include lots of images and case studies but little text. Product specification is not necessary.

An outside Philips example of a Bid Book would be the one that any city who wishes to host an Olympic Games must submit to the International Olympic Committee. These Bid Books contain all specific details with regards to financing the Games, sports venues and Olympic village, sports culture, experiences in holding continental and world sports/cultural competitions, their intended logo for the Games, and other pertinent informations like transportation, security, accommodations, medical services, doping control, technology and media operations.

Goal

Attract, initiate conversation with the client. Create awareness of Philips lighting solutions. Express experience and emotions: lots of images, little text, and no product specification. Describe the potential value of the system from the different stakeholders' perspective.

- Example outside Philips: Olympic Games applicant cities bid book.
- Example inside Philips: Arena team.

Content

- Introduction story
- Inspirational case studies
- Philips Hospitality Lighting Services
- Top tips / Educational LED technology
- Control systems

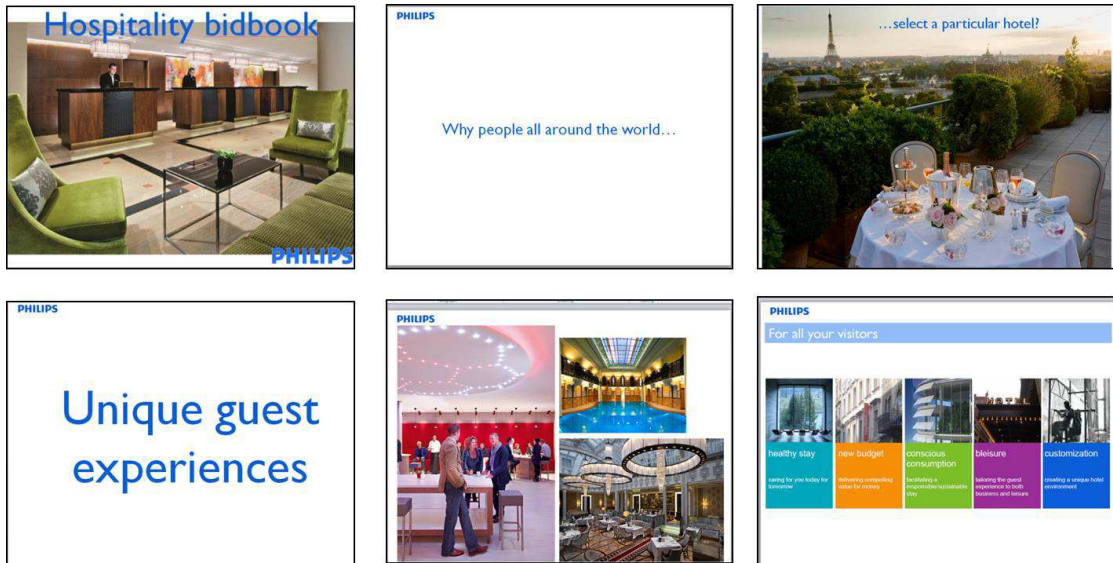


FIGURE 8.5 EXAMPLE OF HOSPITALITY BIDBOOK (MATERIAL DEVELOPED FOR INTERVIEWING PURPOSES)

Strong points (form interview results)

- Simple and practical
- A master document is easy to tailor
- Captures the atmosphere of the first conversations with the clients
- Helps presenting Philips as the perfect partner for total lighting solutions

Weak points (form interview results)

- Gives too much information
- A3 format is too big to carry around
- Needs to be translated to the local languages
- Needs to be updated

Additional comments (form interview results)

- “This is fantastic, I’m impressed with this concept”
- “Should be perceived as a value adding service”
- “Consumer luminaires need to be included”
- “I would use the Bid Book on the iPad, not printed”
- “The customization of the master Bid Book needs to be easy and quick”

Interactive Tool Pre-Rendered Rooms

This high relevant tool has already been developed for the Consumer market and can be accessed in the Philips “*Experience Beauty of Light!*” webpage³ as a Beta version. At the moment this report is being written, more than 800 consumer luminaires products are available in the tool. Among the available templates, different scenarios of the typical areas in a house are shown. During the interviews conducted for this research, a prototype tool named “Interactive Tool Pre-Rendered Rooms” was presented. This prototype is inspired by the “*Experience Beauty of Light!*” tool, but envisioned for the professional business customers.

Fagerhult, one of Philips lighting competitors, has a similar tool available online. Their tool provides the following scenarios: indoor (cellular and large office, classroom, conference room and corridor), retail (fashion shop (shown in Figure 8.6), car showroom, media shop, supermarket), outdoor, health and care (ward rooms, corridor).

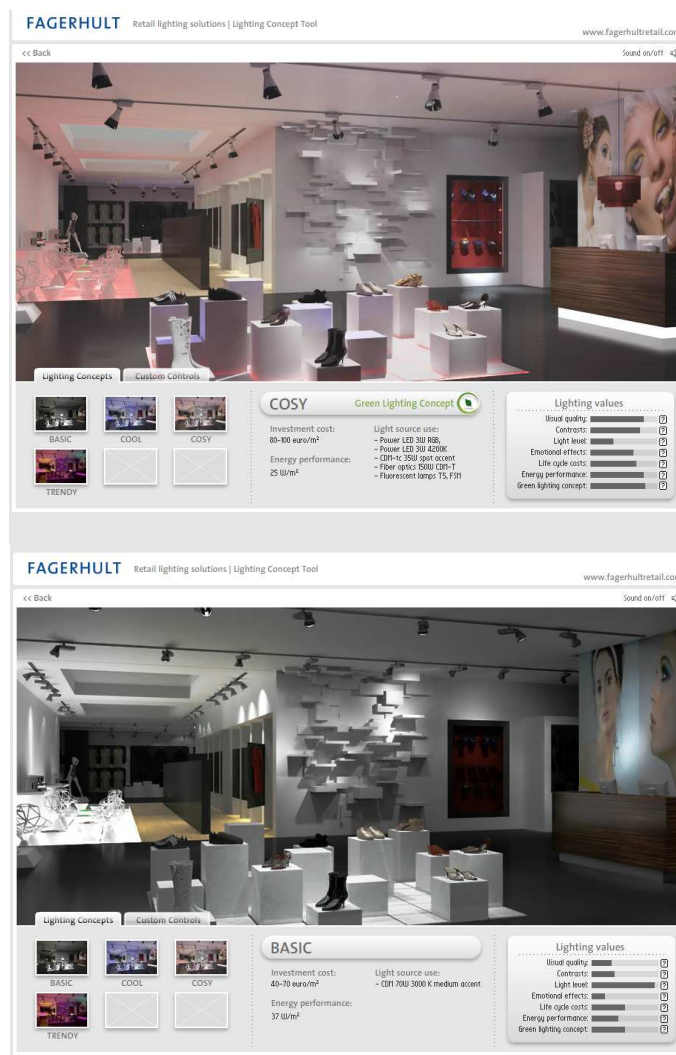


FIGURE 8.6 EXAMPLE OF INTERACTIVE TOOL PRE-RENDERED ROOMS (FAGERHULT AVAILABLE ONLINE TOOL AT <http://www.fagerhult-lct.com>)

³ <http://www.pwl.philips.com/#rooms>

Goal

Inspirational and concrete examples of solutions. Look and feel of (hotel/retailer) brand-specific rooms or scenarios. By showing the possibility of choosing from different scenes, the customer becomes aware that a full solution is what is offered.

Content

- Pre-set scenes
- Scenarios
- Individual lights control
- Lighting concepts: general lighting, light temperature, accent lighting, wash lighting, wall washing, white lighting, color lighting, natural lighting, brilliance, glare, uniformity and dimming possibilities

Strong points (form interview results)

- Easy to use, flexible and realistic
- Helpful to explain general lighting concepts
- Helpful to show different solutions (and new propositions, e.g., CrispWhite)
- Overcomes the problem that some customers have imagining different solutions outcomes
- Different alternatives (dimensions, layout, furniture) allows to select the render that better matches the customer profile/environment
- Useful to show what lighting control can do
- Moves away from the overused PowerPoint

Weak points (form interview results)

- Prototype tool is not dynamic enough
- No use after awareness and interest phase
- It doesn't show real case studies
- Slightly similar brand-looking rooms is not enough (needs to be very similar to the customer scenario)

Additional comments (form interview results)

- "I would include the renders in the Bid Book"
- "If I had this tool, I would use it next week for a very large hotel chain customer meeting"
- "I would add a zoom button to see the effect of certain lighting in the objects"
- "The fashion store looks too empty (high end brand)"
- "The blue dress in the fashion store doesn't look real"
- "Helps catching-up with competitors' tools (not overcoming)"

Interactive Tool Real Photographs

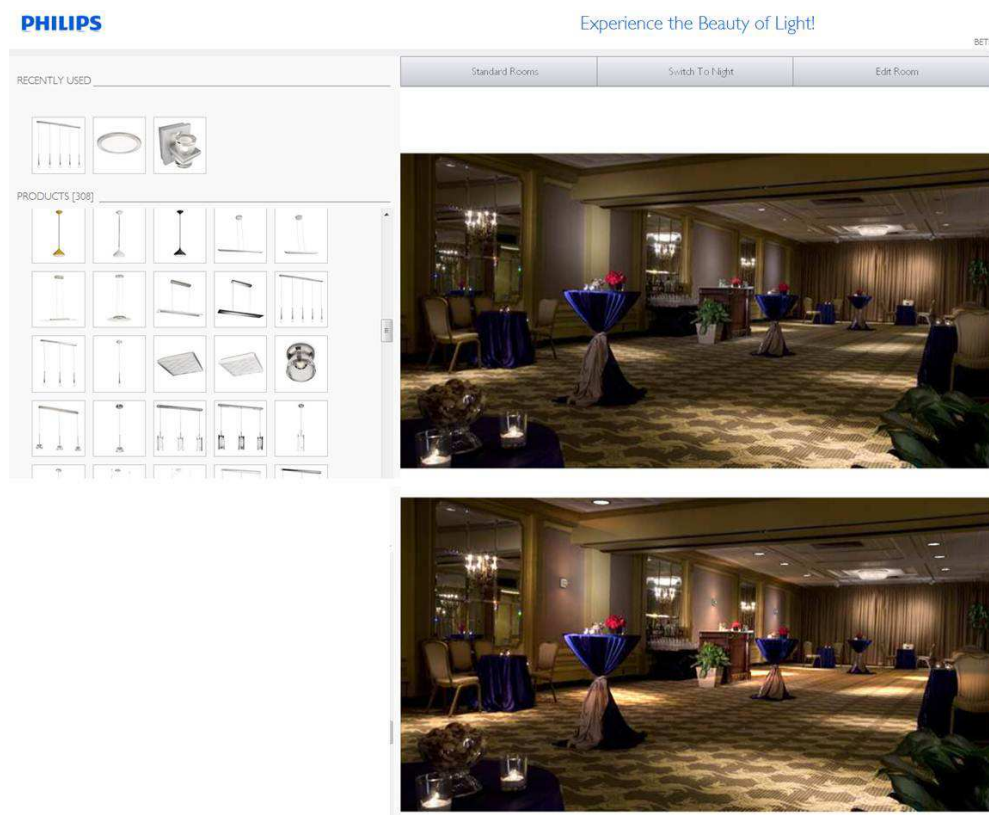
In the same tool introduced before (*"Experience Beauty of Light!"*⁴) the option to upload pictures is possible. After uploading the picture, box-modeling, which consists on indicating the right geometry of the room, is necessary. During the interviews conducted for this research, a prototype tool named "Interactive Tool Real Photographs" was presented. This prototype is inspired by the *"Experience Beauty of Light!"* tool, but envisioned for the professional business customers.

Goal

Engage with the customer; show the value of partnering with Philips form the early stages of the solution design process. Similar to the Philips consumer luminaires' online tool. Full scoping session is needed. A major drawback is the loss of light quality fidelity when not using the appropriate beamer/screen.

Content

- Individual lights control
- Lighting concepts: general lighting, light temperature, accent lighting, wash lighting, wall washing, white lighting, color lighting, natural lighting, brilliance, glare, uniformity and dimming possibilities



**FIGURE 8.7 EXAMPLE OF INTERACTIVE TOOL REAL PHOTOGRAPHS
(PHILIPS AVAILABLE ONLINE TOOL AT <http://www.pwl.philips.com>)**

⁴ <http://www.pwl.philips.com/>

Strong points (form interview results)

- This tool would present Philips in a completely different way (we could reach architects and other creative specifiers)
- Allows to impress the customer, shows that you care and that you spent some time learning about its profile and needs
- This tool shows better (aesthetical) results than the Dialux renders

Weak points (form interview results)

- Too complex to be used by KAM, LiAS needs to be involved
- KAM needs to spend additional time on this (and may not add additional value)
- Tool is less conceptual
- This tool doesn't give the message "What light can do"
- Difficulty of having the tool always updated

Additional comments (form interview results)

- "Should be available for the customers so they can also play with it"
- "I would only use this tool from the third meeting onwards"
- "I would also use it within Philips to discuss about the project"
- "Needs to be possible to be imported/exported from/to Autocad and/or Dialux"

8.3 COMMUNICATION FRAMEWORK CONCLUSIONS

The **Bid Book** concept is unknown but highly appreciated. It perfectly captures the atmosphere of the first conversations with the clients and the Key Account Managers are willing to do the personalized version (based on available modules). However, the A3 format is seen as too large and the content would need to be translated and updated every year. For the development of the Bid Book, it is necessary to:

- Create a master template with an introduction and content message - by the marketing team
- Create an online platform - by the marketing team
- Create one central updated Philips projects database with customer satisfaction letters and new inspirational pictures of case studies - by the marketing team

The **Interactive Pre-rendered Rooms Tool** is seen as a very innovative and useful tool that helps communicating different lighting solutions. Multiple template alternatives have to be built per area/room in order to match the customer profile (high, medium, low-end). For the development of this tool, it is necessary to:

- Identify which lighting concepts need to be visualized: general lighting, light temperature, accent lighting, wash lighting, wall washing, white lighting, color lighting, natural lighting, brilliance, glare, uniformity, efficiency and/or dimming possibilities by Segment Marketing
- Identify which products need to be included - by (local) Segment Marketing
- Lighting plan & scenes design - by LiAS Philips Lighting Department
- 3D rooms models and renders - by External agency or Philips Research
- Creation of the tool - by External agency (for example Novalux, INDG) and/or Philips Research

The **Interactive Real Photographs Tool** is seen as a complex tool, less conceptual and less inspirational. In comparison to the pre-rendered rooms, the feedback from the interviews reflects that this tool has a lower added value. Especially because lighting specialists would need to be involved since the KAMs are not willing to do the box-modeling design on their own. For the development of this tool, it is necessary to:

- Adapt the box-modeling interactive tool (developed and available for Consumer Luminaires) to enable new features (e.g., light channel controls, or spotlight orientation) - by External agency or Philips Research
- Identify which products and lighting concepts need to be included - by (local) Segment Marketing
- Create applications lighting design - by LiAS Philips Lighting Department

9 MANAGEMENT SUMMARY

Moving from a Lighting product provider to a total solution partner brings new challenges. Specifically, for the Hospitality segment, it has been observed that Philips has many elements of the solution, but not an integrated story. This story needs to be easy to communicate, and flexible enough to cover a variety of Hospitality customer wishes. Additionally, it has been perceived among the sales force, that guidance and support throughout the new solution consultative selling process is needed.

Therefore, the present report shows the needed functionalities in each area of a typical hotel, proposes detailed total lighting solutions to match these needs, and explores the potential of new communication tools. As most of these hotel areas are designed to provide comfort, save energy and be flexible for various uses and purposes, the proposed solutions entitle not only lighting, but also intelligence. This intelligence provides, for example, the availability to switch between different lighting scenes in a lobby, or the integration of temperature, audio, video and blinds control in a meeting room.

Since guests spend most of their time in their hotel room, and also, on average, guest rooms represent 70% of the total space in a hotel, more in depth propositions have been created for this area. Moreover, lighting designs for guest rooms are easy to multiply due to the large number of rooms in a hotel, and the similarity among them.

Taking into account the time and urgency factors, the budget constraint, and the speed of renovation, three levels of lighting solutions for guest rooms are proposed:

- Energy: for quick results and short payback (based on relamping)
- Comfort: for small hotel renovations
- ComfortPlus: for hotel new builds and deep renovations

For each of the levels, the features, the benefits and the related values have been identified. These benefits and values are always envisioned in the eyes of the Philips customer: hospitality stakeholders such as the Manager of a hotel. The most appreciated values of these propositions among customers are the reduction in lighting and energy consumption, the lower maintenance need and the green image (via energy and environmental standards and certifications). The propositions Comfort and ComfortPlus offer additional benefits of brand differentiation and increased guest comfort which should ultimately lead to increased (return) bookings.

Nowadays, only the basic level of solution (“Energy”, based on re-lamping) has been rolled out in a large number of projects; and, taking into account the rhythm of implementation, a majority of the European hotels will have switched to LED in the coming years. For the other two higher levels of solution proposed (Comfort and ComfortPlus) already some case studies can be found in the Philips Hospitality portfolio; but, the development of new communication tools, would help capture the associated potential to them.

An investigation of the use of existing communication tools reveals that, during the first selling conversations with customers, a majority of the Key Account Managers use their own presentation or no material at all. They also stated that:

- the Hospitality Brochure is not being used as an inspirational tool, but as a leave behind material so the customer remembers Philips, and
- the Hospitality Reference Application Guide – envisioned to support lighting specifiers and architects on the technical level of the selection of lamps and luminaires for a project – is not being used.

Among the new communication tools that have been investigated during this project, visualizations fit best with the main wishes of the interviewed Philips sales force: there is a need to create tools that educate the customers, and also, they revealed the need to establish a fluent conversation with creative specifiers. Through these interviews, the potential of three visualization tools new concepts was also investigated. In general, preset tools (based on templates) are better appreciated than the ones that imply advanced lighting design knowledge (based on real photographs).

The main recommendation, based on the feedback from the Philips sales teams in various European countries, is to build a tool with a set of pre-rendered templates, in order to match different customer environments (e.g., high-end, medium and budget range). More than 85% of the respondents stated that they would actively use such a tool in the lead generation pitch, and more than 90% believe it would create a higher interest from the customer.

LIST OF ABBREVIATIONS

A/C	Air conditioning
AIDAR	Attention, Interest, Desire, Action and Retention
BMS	Building Management System
BREEAM	Building Research Establishment's Environmental Assessment Method
CF	Cash Flow
CFL	Compact Fluorescent Lamp
Em	Illuminance
EPC	Energy Performance Contract
ESCO	Energy Service Company
GRMS	Guest Room Management System
HVAC	Heating, ventilation and air conditioning
IDDS	Integrated Daylight Dimming Systems
IPTV	Internet Protocol Television
IRR	Internal Rate of Return
KAM	Key Account Manager
KIC	Knowledge and Innovation Community
KPI	Key Performance Indicator
LED	Light-emitting diode
LEED	Leadership in Energy and Environmental Design
LiAS	Lighting Application Specialists
M&V	Measurement and Verifications
MDD	Movement Detection Dimming
NPV	Net Present Value
PDEng	Professional Doctorate in Engineering
PMS	Property management system
R _a	Colour rendering
ROI	Return On Investment
SAI	Stan Ackermans Institute
SAM	Serviceable Available Market
SEB&C	Smart Energy for Buildings & Cities
SOM	Serviceable Obtainable Market
TAM	Total Addressable Market
TL	Tube lamp
U ₀	Uniformity
UGR _L	Unified glare rating

APPENDIX A

List of interviewed Philips stakeholders:

1. Christina Taake, Hospitality segment Marketing Manager DACH
2. Johan Lieben, Belgium KAM , Shop & Hospitality
3. Mirjam van der Kaaij, KAM Hospitality Netherlands
4. David Albertín, Segment Marketing, Spain
5. Sonia Salan Asensio, Business Developer Food & Hospitality, Spain
6. Kent Mårtensson, KAM, Retail & Hospitality, Nordic (Stockholm based)
7. Renaud Dauby, Hospitality KAM Belgium
8. Boris Sarjanovic, General Manager, CEE (South district)
9. Jan Sewerynik, KAM, Hospitality Segment, CEE (North district)
10. Simon Saether, KAM Retail and Hospitality, Nordic KAM Rezidor
11. Sven Bjorn Hillesund, KAM Retail and Hospitality
12. Jorgen Bo Jensen and Simon Saether, KAM Retail and Hospitality, Architects & Specifiers, Nordics
13. Heine Olsen, Product Marketing Manager, Nordics (Denmark based)
14. Oliver Bryant, KAM Hospitality UK
15. Gerben Smid, KAM EU Indoor NL

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