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Philips: Pricing the LED Bulb (A)

Kim Blankens, marketing manager for consumer lighting products at North American Philips (Philips), was discussing with Carol O'Neill, the Philips brand manager, the problems of consumer education and product positioning for Philips LED, a "premium-priced, energy-efficient, long-life, compact, light-emitting diode (LED) light bulb." There was considerable consumer resistance to Philips LED's $20 purchase price (compared with less than $0.50 for a standard white incandescent bulb or a $3.00 compact fluorescent lightbulb (CFL). In product positioning, the dilemma was which feature to emphasize: protecting the environment or cost savings to the user. Further, there appeared to be differences in the way individual consumers evaluated light bulbs relative to businesses that sometimes needed to make bulk purchases of light bulbs.

History of Longer Life Bulbs

Previous consumer marketing efforts using standard advertising approaches and selling through conventional retail outlets (mainly grocery stores) were not successful with high-priced bulbs designed for long life and energy savings. Super Bulb, Philips' first generation of energy-saving bulbs, never reached projected sales. With typical soft white incandescent bulbs selling at a retail price of $0.35 in 1974, the retail price of the Super Bulb at $0.75 could have been considered too high. In spite of the higher prices, the manufacturer and retailer economics of the Super Bulb were also questionable. Super Bulb relied on the expensive gas, krypton, to achieve its longer life. This increased its unit variable cost to four times the $0.088 of soft white bulbs. And retailers demanded 55% margins for these bulbs that put considerable pressure on Philips' own margins. The product was discontinued after less than two years on the market.

Current North American Lighting Market

Incandescent, fluorescent, and halogen (quartz) light bulbs made up the bulk of the consumer market. (For details on each bulb type, see **Exhibit 1**.) Incandescent bulbs accounted for 61% of home-lighting sales volume, fluorescents represented 34%, and halogen about 4%. LEDs accounted for less than 1%. **Table 1** shows the various bulbs and their performance and price attributes.

This case was prepared by Thomas Kohler, Associate Director, The Boston Consulting Group, and Ronald Wilcox, NewMarket Corporation Professor of Business Administration, Darden School of Business, University of Virginia. This case includes estimates by the case writers. It was adapted in part from Sheryl Gatto, Tamara Harvey, and Paul W. Farris, "Philips Lighting Company," UVA-M-0401 (Charlottesville, VA: Darden Business Publishing, 1992) from which some quotes and information have been derived. Copyright © 2017 by the University of Virginia Darden School Foundation, Charlottesville, VA. All rights reserved. *To order copies, send an e-mail to* sales@dardenbusinesspublishing.com. *No part of this publication may be reproduced, stored in a retrieval system, used in a spreadsheet, or transmitted in any form or by any means—electronic, mechanical, photocopying, recording, or otherwise—without the permission of the Darden School Foundation.*

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Table 1. Percentage of 2014 retail residential market.
(excluding decorative, outdoor, and specialty lighting)

Technology	Est. Retail Price	Wattage[1]	Light Output (Lumens)[2]	Rated Life (hours)	% Units
Incandescent					61%
Standard white	$0.40	75	800	750	–
Soft white	$0.60	75	800	750	–
Energy savers	$1.00	67	970	2,500	–
Halogen	$3.90	60	980	3,000	4%
Compact fluorescent bulbs, tubes	$3.00–$10.00	18	1,000	7,000–12,000	34%
LED bulbs	$8.00–$23.00	10	800	>10,000	<1%

Data sources: All tables created by author using fictionalized data from Lowes.com and Homedepot.com and author estimates.

Sixty-watt incandescent bulbs were the most commonly used, mainly because lamp fixture warning labels prescribed them. (The warning arose from concerns about heat produced by high-wattage bulbs in small lamps with low shade clearance.) The next most popular wattages were 100, followed by 75. Although standard white bulbs were at the low end of the price scale, they did not have a major share of the market. Market research conducted by Philips showed that once consumers switched to soft white bulbs, which provided light that was less harsh than standard white bulbs, they rarely went back to standard white bulbs.

Competition

The $3.2 billion residential and retail lamp market (measured at manufacturer revenues) was dominated by three major firms in the United States: GE, Philips, and Sylvania. **Table 2** lists each firm's estimated market share.

Table 2. Estimated retail dollar market share of leading light bulb manufacturers.

General Electric	51%
Sylvania	10%
Philips N.A.	19%
Other brands and imports	20%

General Electric

GE dominated the U.S. consumer light bulb market. It had the broadest geographical distribution and was the major supplier of the supermarket channel, the largest of the outlets. GE was also successful in selling through such major discounters as Wal-Mart and Sam's Club. GE focused on efficiency in producing and selling large quantities of standardized products, such as soft white 60 watt bulbs. GE received publicity for efficiency improvements that cost $15 million to install at its lighting plant.

[1] Wattage was a measure of energy consumption.
[2] Lumens were a measure of light output.

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Sylvania

The company successfully gained a major share of the light bulb market by focusing on emerging wholesale clubs and home centers but did not have a significant distribution in grocery stores or supermarkets.

Importers

Imports were able to double their share over the past decade and now captured 18% to 20% of the U.S. retail light bulb market by offering high-volume products such as standard white incandescent bulbs as well as low-cost CFLs, floodlights, and some decorative lamps to provide an attractive mix of volume and profit. Discount outlets often used imported brands or private-label bulbs as cheap alternatives or as traffic builders.

Philips' Competitive Strategy

To gain share, Philips focused on developing new products and marketing innovations through the trade. Kim Blanken commented, "Light bulbs are primarily a push product, so we don't target the consumer as much as the trade (distribution channels) in our promotion."

Philips used limited national advertising combined with programs that supported loyal retail chains to counter the dominance of GE in supermarkets. The company developed account-specific promotion programs for the lighting category and worked with individual retailers to design promotional programs and product offerings that matched the demographics of the retailer's customer base: Holidays, local events, and sports teams were used for these purposes. Shelf plans were tailored to produce the product mix and revenue per square foot required for each retailer's program. According to Blanken, a constant concern was how to optimize the allocation of resources between the standard business and new products that could be "light years away from changing the market."

The Philips LED

The Philips LED was one of the first LEDs on the market. These bulbs offered impressive reductions in electricity bills, and their average life expectancy was about 13 times longer compared to incandescent bulbs. LEDs offered slightly better energy efficiency than CFL bulbs, but also offered other advantages such as being more environmentally friendly due to the absence of Mercury, shatter resistant, and dimmable. **Exhibit 2** shows the average residential rates per kilowatt-hour in each state.

Businesses, as opposed to individual consumers, could negotiate from 10% to 20% lower prices for their electricity due to their high volume usage. They also shopped differently. While individual consumers often bought bulbs in grocery stores or discount clubs, larger businesses tended to purchase bulbs from electrical parts distributors. These distributors did not sell directly to consumers, only handled relatively large orders, and typically had about a 20% mark-up on light bulbs and similar products. The U.S. market had 10 major electric parts distributors, and each distributor usually concentrated their business in the geographic areas proximate to operations.

The LED light bulb market was in its early stages and only few of the competitors had offerings in the market. There were rumors that GE and Sylvania were going to launch their bulbs very soon. **Table 3** presents a comparison of the brands and some key specifications.

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Table 3. Performance/price of LED 75 watt equivalent light bulbs (A-type).

Brand/Mfr.	Watts Used	Lumens Output	Rated Avg. Hrs. of Life
Philips LED	9	800	18,000
Soft White, Sylvania	9	800	14,000
Soft White High Definition, GE	11	800	15,000
Soft White, CREE	10	820	20,000

When CFLs were launched, Sylvania targeted home centers and discount stores and avoided the grocery store distribution channel. As one Sylvania salesperson said back in the day:

> We firmly believe that you need some kind of sales support to sell a light bulb that costs 10–20 times the price of a conventional incandescent. You may have demos for sales associates and so on. And there'll be someone on the floor to represent the product. Therefore, supermarkets are probably the last place to think of selling and putting together some kind of program…Sylvania will most likely apply this rationale for the launch of LED bulbs.

Retailers had a mixed reaction to this new influx of technology in the lighting market. On the one hand, retailers of all sorts generally liked positioning themselves as a place where consumers could purchase the latest versions of new products. However, these new bulbs were expensive for retailers to carry because they required more money in inventory carrying cost, and they had lower turnover on the shelf. Some retailers also worried that because the bulbs lasted such a long time, they might lose some store traffic because consumers would not need to stop at their store because of a burnt-out light bulb.[3]

Because of these concerns, the average retail margin on these products was still about 55%, and it was unclear how much leverage any of the major manufacturers had in attempting to persuade the retailers to lower their margins. Also, Philips' production costs were much higher—about $4.00 per bulb—than for the original Super Bulb. These high production costs combined with large retail margins made reducing retail prices while maintaining product profitability quite difficult.

A Conjoint Analysis of the LED features

To better understand the preferences of individual consumers as well as potential business customers, Philips hired a market research firm to perform a conjoint analysis on the salient features of its bulb. The study focused on four features; name of the bulb manufacturer, number of watts used, lumen output, and retail price. The results of the analysis, both for a cross-section of consumers and potential business customers, are shown in **Table 4**.

[3] This case included Ace writers.

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Table 4. Conjoint analysis of bulb attributes.[4]

Attribute	Level	Consumer Utilities	Business Utilities
Manufacturer	GE	5.1	2.2
	CREE	−8.0	−4.3
	Philips	2.9	2.1
Watts	25	−9.2	−23.3
	20	−7.0	−12.9
	15	−2.4	0.3
	10	6.1	12.1
	5	12.5	23.8
Lumens	300	−15.5	−23.7
	500	−7.7	−18.5
	700	−0.4	−2.1
	900	9.1.	3.0
	1100	9.0	19.9
	1300	9.1	21.4
Price	$5.00	30.7	11.9
	$7.00	22.3	9.8
	$9.00	21.0	7.7
	$11.00	1.1	5.7
	$13.00	−2.2	0.1
	$15.00	−5.3	−1.3
	$17.00	−7.4	−3.1
	$19.00	−7.7	−4.2
	$21.00	−15.6	−6.9
	$23.00	−17.1	−9.0
	$25.00	−19.8	−10.7

Closing Comments

The team at Philips had much to contemplate. How should it position the new Philips LED? Whom should it target? And finally, given all the team knew about consumer and business preferences and the likely reaction of its channel partners, how should the Philips LED be priced?

[4] All utility estimates were statistically significant.

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Exhibit 1

Philips: Pricing the LED Bulb (A)

Basic Types of Lighting

Incandescent

The "all-American" incandescent light bulb is, in reality, an electric space heater; approximately 90% of the electricity that passes through a standard incandescent lamp is converted to heat, and only 10% into visible light. An inert gas fill such as nitrogen or argon is used inside the glass bulb to slow the oxidation of the filament. From an energy-efficiency standpoint, incandescent lamps should ideally only be used where (1) no more energy-efficient alternative is available, (2) they will be operated for short periods, relatively infrequently, and energy consumption is not an issue, (3) the light source must turn on instantly and operate at full light output regardless of temperature, or (4) full range dimming is desired.

Tungsten-Halogens or Quartz-Halogens

Tungsten-halogen (or quartz) lamps are turbocharged incandescents. Compared with standard incandescents, these produce a brighter, whiter light and are more energy efficient by operating their tungsten filaments at higher temperatures.

Compact Fluorescents and Standard Fluorescents

The quality of the light fluorescent product depends largely on the blend of chemical ingredients used in making the phosphors; there are dozens of different phosphor blends available. The most common and least expensive are "cool white" and "warm white." These, however, provide a light of relatively poor color-rendering capabilities, making colors appear washed out, lacking luster and richness. On a color-rendering index scale (CRI) of one to 100, being best, they rate 69 and 52, respectively.

Light Emitting Diodes (LEDs) and Organic Light Emitting Diodes (OLEDs)

LEDs are a type of solid-state lighting (SSL), i.e., a semiconductor that emits light due to the photoelectric effect when an electric current passes through a particular type of diode. Originally, LEDs had low light density and were limited to very few light length waves and as a result were mostly used in electronics as indicator lights for switches. Over the years, LEDs caught up with other lighting technologies in terms of energy efficiency, intensity, light coloration, lifetime and versatility. As with all semiconductors, cost is expected to decrease over time and LEDs will successfully compete with conventional lighting technologies in a broad range of applications.

The next generation of lighting technology is already on the horizon and called Organic Light Emitting Diodes (OLEDs). OLEDs are organic semiconductor in a layer that directly emit light when supplied with an electric current. They offer even greater energy efficiency and other benefits. OLEDs are already mass-produced as smart phone displays.

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Exhibit 2

Philips: Pricing the LED Bulb (A)