

**Voices for SSL Efficiency:
Opportunities to Partner and Participate
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DETAILED CASE STUDY FOR BREAKOUT SESSIONS

LED Spotlight for Retail Store Lighting

A core activity of the DOE SSL Market Introduction Workshop will explore case studies based on five hypothetical SSL products intended for various market applications. Workshop attendees will participate in one of the five case study breakout sessions.

This exercise is a vehicle for determining how DOE commercialization plan elements will best support the market introduction needs of new SSL products. It will serve to identify major stakeholders and the elements of the DOE programs where their participation will be most valuable. And it will provide valuable feedback to improve the design of DOE programs.

The Assignment

Each breakout group will consider one case study, working together to:

- Outline a general strategy to sell their target product, identifying issues that are particularly important for that product, such as barriers to overcome, critical information needs, involvement of critical trade allies, etc.
- Consider which elements of the DOE commercialization programs can best support their strategy and how. Could there be improvements?

The case studies include a lot of questions, provided to help you think about the issues. Some may apply, and some may not. The group doesn't need to address all the questions, but should address the questions and issues that are most important for this case study.

Case Study Structure

Each case study includes:

- An Introduction that identifies the product and places it within its intended market segment, outlining competitive advantages and disadvantages.
- The Product Description offers additional detail on performance.
- Pricing further defines the market served.
- Other Considerations are things the group may want to think about specific to this product.

Please note: The case study products are *hypothetical* products with *plausible* performance parameters (or that's the intention). In many cases, they would be technically challenging to produce today, but that doesn't matter for this exercise. Don't worry too much about the performance or market numbers, or spend time re-designing the product. This information is provided in the case studies only to help you understand the issues related to this product.

LED Spotlight for Retail Store Lighting

Introduction: The product offered for this business case is an adjustable LED spotlight intended for accent lighting in retail applications. A typical competing conventional product would be a 50W halogen MR16. The LED has a substantial advantage in terms of energy efficiency – a factor of two – and it lasts over ten times as long as the halogen. The cost of the product is higher than the conventional technology, but the energy savings will make up the first cost difference in only a year or so. Color quality is paramount in these situations, and the halogen light has a slight edge over the LED solution in terms of nominal color rendition, so this is a trade-off. However, there are issues with the measurement of color rendition for LEDs, and the perception is that the difference in color quality is smaller than indicated by the CRI figure, but it nonetheless is a marketing issue to be considered. On the other hand, a potential advantage for the target product is that many potential buyers will highly value the absence of IR radiation from the LED spotlight because it allows their employees to work much more comfortably under the lights, and because certain heat sensitive products, like chocolates, could be put under spotlights.



Product Description: The LED spotlight fixture delivers approximately 1000 lumens, which is comparable to or a little better than an MR16 luminaire of similar design. However, the lamp and driver draw only 25W, providing an efficacy of 40 LPW, twice that of the competing product. Note that this is an integrated design, *not* a “replacement bulb”, and in fact the driver module is located remotely from the light source to avoid overheating issues that very likely would result by incorporating it into the “front end” source. The housing, which in combination with the source module provides for heat-sinking of the LEDs in addition to the drive electronics, is not compatible with conventional technology light sources. And, in fact, the light source itself is somewhat larger and differently shaped than an MR16 package for heat control reasons. Lifetime of the LED product is stated to be 40,000 hours – over ten times that of the halogen. For this product, a CRI of 90 has been achieved with a combination of white PC LEDs and multiple additional monochromatic chips. Although nominally not as high a CRI as halogen lighting, the actual color appearance of this product is said to be equally as good. The manufacturer claims that the standard CRI measurement does not adequately express the very high quality of the light and is very concerned that unless the standard is changed customers will never even *see* the light to appreciate how good it is. The color temperature of 3200K, moderately warm, is favored by designers for high-end retail applications, but it is somewhat cooler than the halogen, which could be a disadvantage in some cases. The light would normally be used in combination with fluorescent general ambient lighting. The light is configured such that once the housing is installed, separate LED driver and source modules allow for maintenance or replacement with an upgrade if needed, although this is expected to be a rare occasion. The reason for offering the capability is in part a PR move to overcome possible resistance to a relatively expensive fixture that could not be maintained.

Pricing: The luminaire, including the LED source, driver, adjustable fixture, and housing is priced at \$110. Competing high-end designer fixtures may be in the range of \$80. While relatively high-priced, the long life, with consequent reduced maintenance cost, and energy savings, justifies the extra cost.

Other Considerations: Commercial lighting purchasers are increasingly sensitive to energy savings and will take that into account when considering the economics. This product is intended specifically to address this market trend. Nevertheless, a one- or two-year payback is about the most they will tolerate in this type of application, primarily because the life of the installation is not necessarily much longer than



that. Buyers in these situations are also skeptical of new technology and are particularly concerned with the possibility that replacement parts may not be available when they are needed. Also, for the targeted market segment, lighting designers play a big role in buying decisions. The appearance and quality of light are paramount while pricing is a secondary but nonetheless important consideration.

The Market: The design and pricing of this light definitely place it in the high-end retail market segment, including boutiques, jewelry stores, etc., which is a relatively small fraction – perhaps 10% in terms of unit sales – of the total retail applications market. The manufacturer contemplates future designs – perhaps in a year or two – that will address additional segments, including, say grocery stores or restaurants and other medium-sized enterprises. However, at the moment the cost to make the fixture may be too high to offer a competitive product in those segments. Operational costs are important also, particularly in a mall setting where many of these stores are located. In these cases the owner of the property may also have something to say about the choice of product. In either case it is not an easy sell for new LED technology. The appearance of merchandise under existing lighting solutions is well known. Designers are risking their reputations by suggesting a new approach and may be reluctant to do so. Retail lighting (including ambient general lighting) accounts for about 20% of the total commercial indoor lighting energy consumption in the United States making it the biggest segment in terms of energy consumption. Typical of most commercial installations, lights are operated for a relatively large part of the day – amounting to about 80 to 100 or more hours/week. And hardwired incandescent lighting fixtures constitute about 20% of the total commercial lighting market but most of these are recessed can lights. As far as the current industry and supply chain structure, replacement lamps are a big business: miniature incandescent lamps, the incumbent competition for the target product, account for over a quarter of total lamp shipments (consumer and commercial) in the U.S. – over one billion/year and cost on the order of \$8 apiece.

The Assignment

Your Job: Your assignment is to design a marketing strategy for this product. Trade-offs in price, energy savings, and color quality will need to be addressed in a constructive way. The marketing strategy will need to address quality and pricing issues squarely in dealing with a complex combination of decision-makers. Your company is a mid-sized manufacturer of commercial lighting fixtures and has been in business for over 25 years selling conventional lighting products and a few early LED products. You have had some success in the market targeted for this product. DOE has developed a plan that will involve many public organizations such as government agencies, utility companies, state energy efficiency organizations, industry organizations, and others. They have begun important educational, technical support, and standardization activities intended to accelerate market development. Most activities, however, are not directed at any particular market segment or product type. An important aspect of this market development exercise is to determine how you can most effectively use these programs to achieve your goals. How should DOE or the other organizations apply or improve these programs to best support the needs of this target product and market?

The Task, Part I: Frame the general outlines of the marketing strategy.

- Is this a good opportunity? Why or why not? Where are the weaknesses in the incumbent products that can provide new opportunity? How can you exploit them? What are the key competitive barriers to success? What are the technological barriers to success?
- How can you best exploit the energy savings inherent in this product to foster market acceptance?
- What has to happen for a successful market introduction of an energy-efficient LED spotlight in this segment? Define “success.” What are your unit sales goals for the first year or two?

- What other segments of the commercial or industrial marketplace might be appropriate for this product? What market actions or product changes would make it more useful in or acceptable to these other segments?
- Decision-makers and buyers have to consider many factors and may be risk-averse (although some may be technology advocates, too). What behaviors will need to change in order to achieve success? What are the barriers to these changes? How can you address them? How can government testing or educational programs assist you?
- What sort of issues do you expect to encounter with your distributors? How will you deal with your traditional sales partners that may lose replacement business in the new paradigm?
- Have the designers appropriately addressed the “maintenance issue” for the new technology? Is it important to the marketing of this product?
- What other barriers do you perceive to marketing of this product?

The Task, Part II: Identify the roles of the government and non-government agencies and organizations.

- In the table below are listed some potential market-assisting activities that many public and industry organizations may be willing to support. Which do you think would be most useful? How might some of these help to address the CRI issue mentioned above? How would you apply these activities to your overall plan?
- Which activities are not useful for this particular product? Why? Could they be improved?
- What other elements would you add to this list?
- You have heard about the commercialization activities at the Department of Energy. How can the DOE best make a contribution to your market plan?
- What other groups will be most important to engage to achieve success? With which aspects of your plan can they most usefully assist?

General Comments and Advice:

- Your team has limited time to put together a solution to this assignment. For best results (and most useful for this workshop) spend only a portion of the first day’s breakout session on Part I and do some brainstorming on Part II. Use the second day breakout to complete your evaluation to tidy up your presentation.
- Don’t spend a lot of time debating the numbers in the case study. The idea is to give you something concrete to work with, not to give you a review of the lighting market or for you to design a specific product.
- Give your product a name. Make it sell!

Campaign elements	Stakeholders and roles[*]	How could you use this element for this product?
<i>Buyer Guidance</i>		
a) ENERGY STAR® Criteria		
b) Design/Purchasing Guidance		
<i>Design Competitions</i>		
a) Lighting for Tomorrow (Residential Fixtures)		
b) Commercial Fixtures Competition		
c) Lighting Design Competition for Exterior & Interior Spaces		
d) State-of-the-Art LED Luminaire Showcase		
<i>Technology Demonstrations/Procurements</i>		
a) Demonstrations of Market Readiness		
b) Demonstrations to Test Field Performance		
<i>Commercial Product Testing</i>		
a) Commercial Product Testing Program		
<i>Technical Information</i>		
a) Information Development and Dissemination		
b) Technical Information Network		
<i>Standards and Test Procedures</i>		
a) Standards/Testing Procedure Development Support		
<i>Coordination/Leadership</i>		
a) Facilitating and Coordinating Local and Regional Efforts		
b) Federal Government Leadership		
<i>Other</i>		

^{*} Stakeholders: Standards organizations, manufacturers, industry associations, commercial lighting distributors, residential lighting showrooms, retailers, ESCOs, EEPs, utilities, state energy efficiency programs, large purchasers, energy efficiency advocates, others...

