



Extending Product Lifecycles for Sustainability

About the Customer

A multinational telecommunications conglomerate embarked on a groundbreaking project to advance traditional street lighting infrastructure. The goal was to develop an innovative solution to address the inefficiencies and limitations of conventional street lighting systems.

The Challenge

The project began in late 2017, focusing on transforming the traditional street lighting paradigm into a smart, efficient, and responsive network. The initial challenge stemmed from the lack of individual control over lampposts within existing grid systems. Additionally, the phenomenon of “day burners”

(streetlights remaining illuminated during daylight hours) highlighted the need for a more sophisticated lighting control solution.

The customer conceptualized motion-sensing light automation for street lighting. This innovative automation is a control device installed on lampposts, enabling independent and remote management of each light fixture. By integrating advanced sensors and communication technologies, the motion sensors ensure optimal energy usage and responsive lighting adjustments based on environmental conditions. In close collaboration with the customer, Benchmark's engineers supported the end-to-end development of the motion-sensing light automation, from initial design and prototyping to regulatory compliance and manufacturing.

Telecommunications infrastructure products often have longer lifespans than consumer communications products. The underlying components, however, may not be available for more than a few years. Infrastructure customers are often left with the option of retiring a product and releasing a completely new design or managing a complex re-design to accommodate new parts.

The customer needed a partner to take full responsibility for managing parts obsolescence and ongoing regulatory compliance, allowing the customer's team to focus completely on new products.

The Solution

Overcoming Obsolescence and Redesign

To address the challenges posed by obsolescence in the critical components, the customer entered into a long-term agreement with Benchmark to provide sustaining engineering services, including end-of-life monitoring and obsolescence management. In one such instance, Benchmark identified that the component used for monitoring light intensity in street and highway lampposts would soon be discontinued. As the original component approached obsolescence, the risk of day burning became a pressing concern, potentially leading to operational disruptions.

Complicating matters further, in the rare event that a controller failed, the lamppost was rendered inoperable, raising safety concerns due to the presence of up to 480 volts coursing through the system. Benchmark's approach to this challenge involved swiftly identifying alternative components and revising the design. By leveraging their expertise in electronic engineering and manufacturing, Benchmark engineers successfully implemented robust solutions that addressed the obsolescence issues and enhanced the reliability and longevity of the lampposts.

Another obsolescence example involved the redesign

of a modem that had reached its end-of-life status. This redesign effort involved integrating new chip technology into the modem, followed by extensive pretesting while adhering to requirements of certification (including UL certification and FCC compliance). By addressing these obsolescence challenges, Benchmark helped their customer to save the scrapping of several hundred thousand units, proving consequential for the customer.

Pretesting and Compliance Support

Benchmark undertook comprehensive hardware development, encompassing electrical and mechanical aspects, to ensure the seamless integration of alternative components into the existing infrastructure. Recognizing the criticality of thorough pretesting to mitigate risks and optimize testing outcomes, Benchmark conducted rigorous testing protocols in their development labs. This meticulous pretesting approach gave them a confidence level of up to 95% that the device would pass testing upon submission to the testing house. Benchmark adhered to regulatory requirements throughout the redesign process, assuring the customer that the redesigned components met all necessary compliance criteria, reducing potential regulatory risks, and ensuring seamless integration into their infrastructure.

Throughout this collaboration, Benchmark identified opportunities for product enhancement, such as optimizing manufacturing processes to reduce unnecessary costs.

Results and Future Outlook

Urban Lighting Landscape Transformation

Through Benchmark's commitment to innovation and quality, they delivered a unique solution that addressed obsolescent challenges, enhanced the product's functionality, and ensured the updated system was qualified to operate within the infrastructure. While quantifiable metrics are still emerging, preliminary

indications suggest significant cost savings, operational efficiencies, and environmental benefits attributable to the motion-sensing light automation deployment. With an initial production volume of 13,000 units in late 2023 and a projected scale-up to 1.5 million units over the next several years, the impact of this collaborative and innovative solution is poised to transform urban lighting landscapes worldwide.

Sustainability for Urban Infrastructure

Beyond product realization, Benchmark's commitment to excellence extends to ongoing support and enhancement initiatives. Through a structured sustaining agreement, the customer remains proactive in addressing cities' feedback, implementing design optimizations, and accommodating bespoke requirements. This partnership fosters a culture of mutual trust and collaboration, ensuring the longevity and success of the motion-sensing light automation deployment. Benchmark's collaborative approach with its customers exemplifies a synergistic

partnership driving innovation and sustainability in urban infrastructure. Through the development and deployment of motion-sensing light automation, the customer continues to redefine the possibilities of smart city technologies, helping the world realize a brighter, more efficient future for street lighting systems.

Global Reach with Personalized Care

Benchmark believes that collaborative partnerships built on trust, reliability, and exceptional service are the key to driving the success of infrastructure projects. The Benchmark team remains dedicated to fostering strong, collaborative partnerships with its customers, whether addressing complex technical challenges or providing guidance on product enhancements. Benchmark's unique position as a company strikes the perfect balance between being large enough to handle the most complex projects, while remaining small enough to provide personalized and accessible customer service.

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