Lighting the Path to Data-Driven Green Procurement and Decarbonization: Life Cycle Tools for Standardizing Environmental Labels

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Background/Objectives. To avoid an irreversible and catastrophic climate change trajectory, we must limit average global temperatures to well below a 2°C increase from pre-industrial levels. Mitigating average global temperature increase is strongly linked to reducing carbon footprints; thus, relevant accounting metrics such as embodied carbon and life cycle footprinting are becoming an increasingly urgent issue.

There are currently many ratings, certifications, corporate pledges, and new regulations driving the building industry to provide sustainability transparency and embodied carbon information. These include regulations that will require the use of environmental product declarations (EPDs) (e.g., the Federal BuyClean Regulation and the California Assembly Bill 2446). In addition, the Inflation Reduction Act (IRA) has tasked the U.S. Environmental Protection Agency (EPA) with aiding industry to standardize and digitize EPDs. Because EPDs summarize results of life cycle assessment (LCA) studies, expanding access to quality LCA data and standardizing LCA approaches within specific product categories are essential to producing quality EPDs. This project focuses on lighting products as a case study: it has been identified that there is a “data gap” in EPDs in lighting and mechanical, electrical and plumbing (MEP) products that could affect many EPD inputs in a whole building LCA.

Approach/Activities. Creating consistent, transparent, and comparable EPDs will require updating and digitizing the PCRs that specify Life Cycle Inventory (LCI) templates for collecting data on specific product categories. These LCI data feed into the underlying LCA studies for each specific product category. Pacific Northwest National Laboratory (PNNL) has been working with leading U.S. manufacturers and international stakeholders to develop and refine the standard Product Category Rule (PCR) that governs the approach for performing LCAs of luminaires. Based on this approach, a case study LCA on luminaries has been performed and an associated digitized LCI template for luminaire products developed. The digitized template is linked to background LCI database datasets. This workflow can also be replicated for the luminaires’ mechanical and electrical product value chain as well as for other building and construction product categories. The digitized luminaire LCI template developed by the PNNL LCA team has high potential for significant impact in the lighting and electrical equipment industries, and beyond.

Results/Lessons Learned. This presentation will discuss approaches taken to standardize the LCA/LCI approach, feedback from the LCI template beta-testing process, areas for improvement for luminaire products that have been identified from the case study work, and pathways for how this template and approach can be applied to other building products and materials. A level-playing field is critical to the success and consistency of the LCA process used in any EPD program. It is essential to ensure that EPDs can be accurately compared and used to inform decision-making, especially for public procurement and utilization of EPD results as public data sources in other product inventories. The template has high potential for significant impact for any product that uses a PCR in North America or in Europe.