

Innovating for Impact: Real-World Lessons in Advancing Sustainable Materials

Melissa Schisler and Nicholas Ball

Abstract:

The development of more sustainable materials is accelerating in response to growing regulatory requirements, brand and market commitments, consumer preference, and societal pressure. As a leading Materials Science company, Dow's ambition is "to be the most innovative, customer-centric, inclusive and sustainable materials science company in the world." Today, more than 90% of Dow's R&D portfolio is aligned to one or more of Dow's sustainability focus areas: Climate, Circularity, and Safer Materials. Dow is a regular recipient of R&D 100, Edison and BIG Awards, among others. As part of Dow's 2025 Sustainability Goal "Safe Materials for a Sustainable Planet", Dow identified ten sustainable alternatives that met four strict criteria compared to an incumbent product: 1) better human and environmental profile, 2) a favorable life cycle assessment (LCA), 3) a comparable performance, and 4) market acceptance. An evaluation of the journey of those ten sustainable alternatives highlighted several critical lessons learned in bringing such solutions to the market. These case studies revealed a complex landscape: regulatory and consumer drivers alone rarely ensure broad adoption; performance and cost must remain competitive; and market acceptance hinges on early and sustained engagement across the value chain. Even when sustainability benefits are clear, customer reluctance, cost sensitivity, technical complexity, and entrenched manufacturing systems can delay or limit adoption. At the same time, Dow's journey demonstrates how proactive innovation, transparent communication, and deep collaboration can enable greater adoption and position the company as a leader in sustainable materials. By sharing real-world examples and the challenges encountered along the way, this work aims to offer practitioners and decision makers a candid view into what it takes to advance sustainable material innovations in practice and how leadership, persistence, and system-level thinking are essential to driving meaningful progress.

Note: Full Manuscript will be available later in 2026.

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